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Plate IV. Frontispiece

LEARNING TO WRITE.

AN

ESSAY

ON THE

Instruction and Amusements

OF THE

BLIND.

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By DOCTOR GUILLIÉ,

DIRECTOR-GENERAL, AND PRINCIPAL PHYSICIAN TO THE ROYAL INSTITUTION FOR THE BLIND AT PARIS, KNIGHT OF THE LEGION OF HONOUR, MEMBER OF THE ROYAL ACADEMY OF SCIENCES, AND OF MANY OTHER LEARNED SOCIETIES.

WITH ENGRAVINGS.

London:

PRINTED FOR RICHARD PHILLIPS;

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1819.

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TO

DR. JENNER,

OF BERKELEY,

THE EVER ILLUSTRIOUS DISCOVERER

AND

INTRODUCER OF THE PRACTICE OF

Vaccination,

WHICH HAS CONFERRED SUCH INCALCULABLE

BENEFITS ON THE WHOLE HUMAN RACE,

THIS WORK,

OF A DISTINGUISHED FRENCH PHILANTHROPIST,

IS DEDICATED

WITH PROFOUND RESPECT,

AND SINCERE ATTACHMENT,

BY

THE TRANSLATOR.

London, March 26th, 1819.

PREFACE OF THE TRANSLATOR.

In Paris, the original of this interesting Work, which is calculated to rescue from the misery of idleness the most helpless of human beings, was printed at the Institution for the Blind, BY THE BLIND THEMSELVES; thereby serving as a practical illustration of the efficacy and value of the labours of the benevolent Author.

It is to be hoped that its translation into English, and its re-publication in this Empire of philanthropy, will lead to the establishment of similar Institutions among ourselves, and, consequently, that some future English edition may enjoy the same pleasing recommendation to public notice as the original French.

That the Work will produce such a gratifying result, the Translator entertains no doubt; and he is persuaded that the

characteristic ingenuity of Englishmen will lead even to many improvements of the French System, though the world will ever have cause to acknowledge its obligations to the amiable and persevering Guillié.

Nor is it in a public sense only that the Work recommends itself; it will serve to solace thousands of firesides, where no comfort has hitherto appeared; and while it amuses listless hours, will enable those to earn their own subsistence, who may hitherto have been a hopeless burden to their sympathizing families.

London, March 31*st*, 1819.

DIRECTIONS TO THE BINDER.

Plate I.	Tables of Saunderson, to face	page 51
II.	Method of Printing	77
III.	Method of Writing	95
IV.	Way of holding the Stilet	96
V.	Mode of Teaching Writing	114
VI.	Teaching the Piano Forte	120
VII.	Teaching the Harp	121
VIII.	Mode of Spinning	130
IX.	Making Purses	134
X.	Mode of Teaching Netting	133
XI.	Making List Shoes	134
XII.	Making Baskets	147

CONTENTS.

Page.

Preface..... v

Introduction..... 1

PART I.

General Considerations on the genius and character of the Blind.

Chapter I. Whether the loss of one sense turns to the advantage of the others..... 15

Chapter II. Of the Memory of the Blind..... 20

Chapter III. Of the faculties which are developed in the Blind, and of the pre-eminence of some of those faculties over those of persons enjoying their sight..... 28

Chapter IV. Moral state of the Blind. Nature of their ideas..... 32

Chapter V. Parallel between the state of the Blind and that of the Deaf and Dumb... 39

PART II.

Biography of Blind Persons illustrious in the Sciences and Arts.

Chapter I. Of the Blind celebrated in the Sciences..... 42

Chapter II. Of the Blind who have been distinguished in the practice of the Arts..... 60

PART III.

Of the Instruction of the Blind.

Section I. Origin of the Institution..... 66

Page.

Chapter I. Of Characters in Relief and of Reading *(with a plate)*..... 70
Chapter II. Of Printing for the use of the Blind 82
Chapter III. Of Books for the use of the Blind.. 87
Chapter IV. Of Writing *(with 2 plates)*..... 91
Chapter V. Of Geography..... 101
Chapter VI. Of the Study of Languages..... 107
Chapter VII. Of Mathematics *(with 2 plates)*... 113
Chapter VIII. Of Music *(with 2 plates)*..... 118
Chapter IX. Of the Means of Communication between the Blind and the Deaf and Dumb 122
SECTION II. Chapter X. Of the Manual Labour common to both Sexes..... 126
Chapter XI. Of Knitting..... 128
Chapter XII. Of Spinning *(with a plate)*..... 130
Chapter XIII. Of Purses *(with a plate)*..... 131
Chapter XIV. Of Girths and Netting *(with a plate)*..... 133
Chapter XV. Of List-Shoes *(with a plate)*..... 134
Chapter XVI. Of List-Carpets..... 135
Chapter XVII. Of Woollen Plush-Shoes..... 137
Chapter XVIII. Of Catgut-Whips..... 140

Of Manual Works peculiar to Boys.

Chapter XIX. Of Weaving..... 142
Chapter XX. Of Chair-Bottoms..... 144
Chapter XXI. Of Ropemaking..... 146
Chapter XXII. Of Basket-Work *(with a plate)* 147
Chapter XXIII. Of Straw, Rush, and Spanish Plush Mats..... 148
Chapter XXIV. Games of the Blind..... 151
Chapter XXV. Conclusion..... 154

INTRODUCTION.

As we commonly make use of the rapid, but not always sure, organ of sight, in order to discern the objects around us, we think that the blind can know nothing that exists, and can never escape from the narrow circle which surrounds them: they are considered as degraded beings, condemned to vegetate on the earth; and it is thought that enough is done for them, when they have been taught to remember the names and forms of objects in common use;—we are not sufficiently penetrated with this truth, that the blind who are not instructed, are all their lives like new-born infants, who cannot provide for themselves: that they would die if not taken care of.

The education of those who have sight begins, we may say, from their birth: they easily imitate the sports of the companions of their childhood, and repeat their slightest motions; they read the physiognomy of their nurse; and the looks of a mother are their best lesson. All this is lost to the blind, entombed for ever in darkness. They are obliged to create every thing, having seen nothing; an action apparently the most simple to other children is a novelty to them. This is, undoubtedly, the cause of that silent and timid attitude in the blind, during the first years

of their life, and of that habit of concentration which never leaves them.

As it is ascertained that they are deprived of the faculty of learning by imitation in their childhood, we should endeavour to supply this deficiency by method; and all that is done afterwards will be only with the view of putting them on an equal footing with other men.

It would be a great mistake, therefore, to confound the blind with common children, and to think they may be instructed in the same manner. The teacher will never succeed, unless he is thoroughly persuaded that the blind perceive things quite differently from us; that they do not attach the same ideas to words; in short, unless he becomes the pupil of his disciple, and studies with him. Always obliged to examine what is presented, or what is said to them, the blind contract very early, and almost *instinctively*, a great habit of analysis: and we must, consequently, expect from them the most original, most extraordinary, and sometimes also the most embarrassing questions. The moral world does not exist for this child of nature; most of our ideas are to him without reality; he acts as if he were alone; he refers all to himself. It is from this deplorable state that we must endeavour to draw him, by teaching him that there are relations and ties of communication between him and other men.

But this instruction of the blind must advance

with an almost insensible progress; we must not be in too great a hurry to gather the fruit; it cannot be begun too early; for the first impressions they receive are never effaced, and it is of great importance that these impressions should be conformable to the direction we wish to give to the blind.

It is evident that speech cannot imitate the form of objects, and that there is no resemblance between sounds and colours: teaching alone, properly exercised, is understood every where, without convention and without commentary; it is the natural language of the blind. This, therefore, is the sense which it is necessary to choose to be the intermediary between the man who has only four senses and him who has them all; and, in fact, it is on this principle that the whole theory of their instruction is founded.

The blind, thus instructed, will not be a calamity to their families; and the insurmountable barrier that was supposed to exist between the man who sees and the man who does not see, will be removed, if the ingenious process invented for their instruction be put in practice. Restored to society and to themselves, they will one day bless the memory of those who erected this monument of beneficence.

It cannot be said, that those who formed a system of instruction for the blind had neither guides nor models; on the contrary, they had the great advantage of walking in the footsteps

of those who had previously instructed them: they too could take advantage of the mistakes of their predecessors. The fruitless essays which many persons, all animated by the same spirit of charity, had already made, sufficiently shewed what remained to be done; but it required all the zeal and devotion of an ardent and enthusiastic man to undertake to write and arrange these scattered elements, in order to make a whole of them, with the addition of the results of his own experience.

The man who devoted himself to this work, and who founded the first school that existed in Europe for the instruction of the blind, was Valentine Haüy. The reader, I imagine, will be pleased to be informed by what chance he conceived the idea of his plan of instruction.

To the relation which he gives of it himself, I shall add the history of the establishment from its foundation down to the present time, together with the considerable meliorations that have been successively made.

"A novelty of a singular kind," says M. Haüy,* "attracted, several years ago, a concourse of people at the entrance of one of those places of refreshment, in the public walks, where the better sort of people go to divert themselves, now and then, in an evening.

"Eight or ten poor blind men, with spectacles

* Précis Historique, p. 119.

on, placed by the side of a desk with music on it, used to perform a discordant symphony, which seemed to give great amusement to the spectators. I, however, felt myself affected in a very different manner, and immediately conceived the possibility of realising, for the benefit of these unfortunate creatures, those means which they were thus employing in such an imperfect and ridiculous manner. 'Does not the blind man,' said I to myself 'know objects by the difference of their forms? Does he mistake the value of a piece of money? Why should he not distinguish an *ut* from a *sol*, an *a* from an *f*, if these characters were rendered palpable, &c.' "

The first asylum which beneficence opened for young blind persons, was instituted in 1784, at the expence of the philanthropic society, which entrusted M. Haüy with their instruction. This society, so justly celebrated for its charitable works, was at the whole expence of the establishment, which was settled in the street Notre-Dame-des-Victoires. In 1785, the number of pupils maintained gratuitously, was twenty-five. Their instruction was so far advanced, by the following year, that they were admitted to the honour of performing an exercise at Versailles, before the king.

On the 16th of February, 1785, M. Haüy submitted to the judgment of the Royal Academy of Sciences, a memorial, in which he ex-

plained the means he proposed to employ for the instruction of the blind.

A report was drawn up by MM. Desmarets, Demours, Vecq. d'Azir, and de la Rochefoucault, commissaries chosen for this purpose, in which they said, " That the method of M. Haüy resembled that of the blind man Payscaux,* and of Mlle. Salignac ; that the process for the study of geography was nearly the same as that of M. Weissembourg, of Manheim ;† that M. Lamouroux had formerly got moveable characters cast for music, &c. &c."‡

Nevertheless, they admitted the printing of books in relief was his own invention ; and after having given an account of the operations performed in their presence, by the young Lesueur, who was born blind, they concluded their report as follows :—" We propose to the academy to give its approbation to the method which M. Haüy has presented to it, and to exhort him to make it public, and to assure him that it will willingly receive any new account that he may give of his efforts to carry it to the degree of perfection of which it is susceptible."§

The Institution thus subsisted, against a thousand obstacles, till 1791. At that period Louis XVI. ordered that it should be maintained at the expence of the state, and placed, with that

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* Report of the Academy, p. 7. † Id. p. 9. ‡ Id. p. 8. § Id. p. 13.

of the deaf and dumb, in the old convent of the Celestines, near the Arsenal; and a law of the 21st of July, confirming the decree of the directory of the department of Paris, regulated the dispositions of its administration.

Another law of the 10th Thermidor, year 3, separated the institution of the working blind from that of the deaf and dumb, and placed the first of these establishments in the house of the Filles Sante-Catherine, street des Lombardes. The number of the pupils was raised to 86, one for each department, and the pension to 500 livres. There was then no administration nor committee of superintendance to controul the operations; the steward settled the accounts with his clerk.

The 26th Pluviose, year 9, a decree of the consuls, which was executed rather suddenly, ordered the working blind to be transferred directly to the establishment of the Quinze-Vingts, and the administration of them to be confided to that hospital. In consequence of this measure, the young blind, under the denomination of blind of the second class, were confounded, for the space of fourteen years, with the poor blind people lodged in the hospital of the Quinze-Vingts, though there was no other connexion between them than the similarity of infirmity. The first of these establishments is one, to which persons may be admitted at all periods of life, without having been born blind, and where each

individual lives by himself; while the other is a college devoted to the instruction of persons born blind, who are maintained there for a limited time, living in common, subject to general rules, and taught to gain a livelihood by work, and who, after having been eight years in the institution, are restored to society.

We cannot but applaud the zeal of the administration of the Quinze-Vingts, and the efforts it made to meliorate the situation of the young blind, during the whole time it was charged with the interests of the institution. But an invincible obstacle constantly sprang up, and thwarted all improvement, which obstacle was the incoherence of the two establishments united together. The degeneration became more sensible every day; the regulations fell into disuse; the young blind remained idle a great part of the day; the study of music was almost their only occupation, as they were no longer employed in manual labour, and only went to two classes in the day. Every thing, in short, announced the approaching ruin of an establishment, which, some years before, had excited general interest.

The administration, convinced of the necessity of early habituating to labour children who, for the most part, belonged to poor parents, attempted to employ them with advantage in the two manufactures of cloth and tobacco, which it established in 1806, within the hospital, for

the blind of the first class, and the individuals of their families who had their sight; but considerable losses soon obliged them to renounce both these enterprises, which, moreover, did not at all meet the charitable intentions of the administration: besides the great inconvenience of the old and young blind being brought together, their labour was useless, as it never could be profitable to them, since they only concurred in it as assistants, without learning, in all its parts, a business which they might afterwards follow elsewhere for a livelihood.

On the 8th of February, 1815, the king, at the same time that he ordered the hospital to be replaced under the direction of the Grand-Almoner of France, also ordered that the institution should be separated from this hospital, that it should belong to the administration of the Minister of the Interior, and should be henceforward managed and governed by a special administration.

This transfer, retarded by the events of the year 1815, was effected on Tuesday the 20th of February, 1816, and the institution is now placed in the ancient seminary of St. Firmin, *rue St. Victor*, No. 68.

Every thing was to be done over again after this transfer, both as to arrangement and instruction; but the most urgent point was the moral re-organization of the institution: to change the spot without changing manners, to admit new

scholars without having previously dismissed those whose presence was prejudicial, would have been more dangerous than useful. It was necessary, therefore, to decide on this painful sacrifice; it was necessary to return to their families a great number of pupils, the unfortunate depositaries of a spirit of insubordination and licentiousness which they had imbibed in their former habitation, and of which the tradition would have been preserved by them.

Forty-three pupils went out of the Quinze-Vingts, and were not admitted at St. Firmin. This ablution disorganized the different parts of the course of instruction; but the zeal of the teachers overcame all obstacles: they laboured eagerly to form new pupils, and success crowned their efforts. At the present moment all is repaired. The classes are filled with pupils distinguished by their aptitude; there are even several, who already at the public exercises excite the astonishment and admiration of the visitors. We are happy, therefore, to seize this opportunity of doing the justice they deserve to our colleague Mr. Dufau, second teacher of the boys, and to Miss Cardeilhac, mistress of the girls, by publicly declaring the obligations which the administration owes them for the assiduous pains they have taken to obtain so rapidly such results.

This digression will, I hope, be pardoned; I thought it necessary, in order to give a complete

idea of the origin and progress of an establishment, which, from its utility, seems so worthy of the interest it excites.

This Treatise will be divided into three parts: the first, comprising five chapters, will contain general considerations on the genius and character of the blind; the second, which will contain two, will be allotted to memorials of the celebrated blind, who have distinguished themselves in the sciences and arts; the third, composed of twenty-two chapters, divided into two sections, will be especially devoted to an account of the proceedings employed in the institution, and of the different modifications they have undergone down to this time.

I shall think myself happy if I have been able to attain the end I proposed to myself in this Essay. I did not wish to compose a merely speculative treatise, or a romance on the instruction of the blind; I wished to offer to those who have not had the happiness of being instructed in this house, the means of being so in the bosom of their family. I wished to prove, by the results of long experience, that the blind may be instructed in some sciences and some arts, as well as other men; that they have dispositions which may be unfolded by methods peculiar to them, and that, by the aid of divers mechanical professions, to which they are brought up, they may easily make a livelihood for themselves.

Far, therefore, from making a secret of the

means that we employ, we should wish them to be known wherever there are any blind persons, and by so doing we only second the beneficent views of government.

Our wishes are now realized in part, as several institutions, founded on the same principles as ours, and according to instructions requested of us, have been established in different countries.* How glorious it is for France, so fruitful in useful establishments, to have been the first to give the impulse to this new species of benefi-

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* The mother of the Emperor Alexander founded in 1806, at Petersburg, an institution for the blind of that vast empire. The Archduke John of Austria, in the journey which he made to Paris, in 1815, took notes himself for a similar establishment at Vienna. M. Kalina de Jatenstein, a philanthropist, no less charitable than disinterested, has instituted, at his own expence, a school for the blind, at Prague. He was acquainted with none of our processes before he visited the establishment at Paris; and we considered it a duty to furnish him with the necessary materials for completing what he had so well begun. It is affirmed that the King of the Low Countries is going to found in his kingdom, where there are so many blind, an institution similar to ours, and for this purpose, a very minute detail of our management and mode of teaching, has been already transmitted to the Dutch Ambassador. The friends of humanity would learn with pleasure that the two fine asylums at London and Liverpool, where the blind receive no instruction, were converted into schools similar to that of Paris, which all the English of distinction, who come to the continent, are eager to visit.

cence, and to see other nations eager to admit among them, and naturalise our institutions!

Happy children! may we now say with assurance to the blind, you will be comforted! no longer, as formerly, will you be repulsed by your fellow-creatures, and considered as a degraded species: the cruel exception which separated you from the rest of men will no longer exist; the wrongs of nature are repaired; your infirmity and the misfortune of your birth will be no longer a reproach. It is to make honest men and sincere Christians of you, that generous persons hold out their helping hand, and strive to create means for your instruction: they felt how desperate your situation would be, if you were not supported and encouraged by the consolations which religion showers especially on the unhappy. Ah! how guilty would you be were you ungrateful! Never forget this noble intention of your benefactors, and consider that an opposite conduct would be the greatest outrage you could commit against their memory.

As for me, the depositary of this precious tradition, I congratulate myself every day, on having been called to co-operate in so good a work, and I flatter myself, that when nothing of me remains but some inanimate clay, you will still preserve among you, my dear children, the remembrance of him who consecrated his life to your happiness and prosperity.

ON THE

Instruction of the Blind.

PART I.

GENERAL CONSIDERATIONS ON THE GENIUS AND CHARACTER OF THE BLIND.

CHAPTER I.

Whether the loss of one Sense turns to the advantage of the others.

A QUESTION has long been agitated, whether the loss of one sense increases the intensity of the others; whether those who are born deaf and dumb, or blind, have any real advantages over other men, resulting from a peculiar developement of the senses they have remaining. The solution of this important question, might throw a great light on the explanation of several phenomena of the human mind, and in this respect, it deserves the thorough attention of philosophers and metaphysicians.

Struck with the error into which many persons

have fallen in this respect, I joined my researches on the blind, to those which my illustrious colleague, the Abbé Sicard, had made on the deaf and dumb, in order to learn what was the cause of it, and I became convinced that neither the deaf, nor the blind, are superior to other individuals enjoying the use of all their senses: the address which is observed in the blind, with respect to the touch, and the aptitude of the deaf and dumb, to seize all the characters of the physiognomy, result from the necessity they are in, at first, of almost continually making use of the sense of touch, to supply the want of sight; and the others, of employing their sight to supply hearing and speech; the organ is in every respect similar to that of those who enjoy their sight, and though the person born blind, that was operated upon by Cheselden, after the extraction of the cataract, no longer perceived objects by the touch as he did before, it was not that, by recovering his sight, he lost the faculty of touching, but only that he then employed it merely as an auxiliary sense, and to correct the sight. The opposite effect happens to persons who become blind, after having seen during some part of their life: both require to form the education of the new sense they gain; the senses which replace those that are lost, are more exercised; they sometimes acquire, I allow, an exquisite fineness, which greatly augments their susceptibility; but the eye of the deaf can never

hear, and the fingers of the blind will never see. It would result from the false principle we are endeavouring to destroy, that an individual who had lost two, and even three senses, would find a compensation in the superior faculties of those which remained; thus, the young girl, who was a few years since at the Institution of the deaf and dumb, and who was at once deaf, dumb, and blind, and thus reduced to two senses, should have found, according to this strange supposition, in touch and smell alone, the means of acquiring ideas, more or less perfect respecting light, sound, and speech. Nothing is more contrary to evidence; she had only a vegetative existence; she was deprived of the impression or vibration, which external objects make on our senses, which for that reason are called *organic sensations*, and cannot exist when the organ destined to perceive and transmit them, does not exist; her soul, as if imprisoned, must have been condemned to absolute inaction:* Nevertheless, this

* Le Roy, a physician, who published in 1812, a very interesting dissertation on laughter, made many experiments on this young person, in order to excite her to laughter, which, as we know, is the immediate effect of a peculiar mode of intellectual perception (that I shall call *mental perception*) produced in us by a ridiculous or droll idea, the idea of derision. We may easily suppose he did not succeed; he only excited a convulsive laugh, which is the result of a factitious sensation, occasioned by the mechanical excitation of the skin, known by the name of titillation or tickling.

young girl, to whom it was impossible to communicate any thing, was perhaps susceptible of those interior emotions, foreign to the organic sensations, which seem to depend more on the mind than the senses; and have more relation to insensible and moral, than to physical and sensible objects. I sometimes saw her face colour, and appear in the state we are in ourselves, when shame or fear surprises us. She then perhaps experienced joy or sorrow, pleasure or displeasure, inclination or aversion; and as our pleasures and pains evidently belong to our soul, of which they are the direct perceptions, without belonging to the body to which it is united, she might very likely feel those emotions which we have called *sentiments of the soul*, and do not even require the necessity of reflection.

Let us conclude, that if, as has been well proved, there is nothing in our mind which has not come by the senses,* when deprived of these intermediaries, we must necessarily want the ideas they give us, because no compensation can physically re-establish the equilibrium when it has been once destroyed. The art of the instructor of the blind, and of the deaf and dumb, consists therefore in conducting artificially to the mind, by new methods, the ideas it would other-

* Nihil est in intellectu quod non prius fuerit in sensu.
ARISTOTLE

wise have been ignorant of. The trouble of such an education, with the obstacles to be overcome, if known, would afford a convincing proof that the privation of one, or of several senses, is the greatest and most irreparable of evils, and can only exist at the expence of our happiness, and of the improvement of our faculties.

CHAPTER II.

Of the Memory of the Blind.

THE memory of the blind is prodigious? Can this phenomenon, certain as to its existence, and unknown as to its nature, depend, as is supposed, on their not being distracted by sight? or may there be any cause in their organization to unfold this faculty in a particular manner?

Though the occasional cause on which memory depends in its exercise and functions will probably always remain a mystery, let us cast a rapid glance over this precious prerogative of man, and examine on what the increase of that of the blind can depend.

The memory has been compared to a magazine in the form of archives, in which is deposited the impression, more or less exact, of an infinity of things of which we have had the image or sensation; an impression which our mind renews and revives at pleasure, and which, when excited, gives, in some sort, a new existence to the ideas and images of the things which it knew a length of time before. Locke

compared it to a brazen tablet filled with characters, which time insensibly effaces, if the graver be not sometimes passed over it. Malebranche says that it consists in the traces which the animal spirits have imprinted on the brain, which are the cause of the facility that we have to remember things; and he adds that the reason why old people lose the memory of past things is, that their fibres are mixed with many humours, which they cannot dissipate, because they want heat. I have mentioned this last definition of memory, by a celebrated man, only to prove how much we are indebted to the physiological sciences, for the precision and exactness which the moderns employ in their definitions; for if the name of Malebranche did not impress a certain degree of respect, one could not help calling this ridiculous definition of memory a downright raving, void of sense and reason.

There is in man a memory of sensation, and a memory of intelligence. The first recalls his perceptions of physical feelings; the second recalls his reflections, judgments, reasonings, speculations, and the pleasures and pains of the moral order of things. He differs in this from the brute, which has only a memory of sensation, and never of intelligence, because knowledge purely sensitive does not imply a substance properly spiritual.

It is principally with this second memory of

intelligence that the blind are eminently provided. They are deprived, it is true, of the means which those that see have of forming an artificial memory; but they have perhaps an internal method, resulting from the very great facility they have of analysing, as I shall demonstrate later.

According to Charlevoix,* in Japan the records of the most important events are confided to the memory of the blind. The annals of the empire, the histories of great men, or the ancient deeds of families, are not more certain documents than the memory of these illustrious blind men, who, communicating their knowledge to each other, form an historical tradition which nobody pretends to contradict. They have academies where they take degrees, and exercise themselves not only in cultivating their memory, but also in putting what they know into verse, and decorating the finest passages of history, with the charms of poetry and music. They have their general, their officers, and magistrates, and enjoy great consideration.

In order to find a physical reason for the inconceivable phenomenon of the memory, some philosophers have supposed, ingeniously enough, a sort of *natural harpsichord* in the brain, composed of an infinite number of strings, of which an innumerable quantity are in unison, so that, as in the artificial harpsichord, the string that is

* Hist. of Japan, chap. ii. p. 203.

touched shakes the one in unison with it, and makes it vibrate, without shaking the others.

In this hypothesis, our memory would have its effect in the following manner: the name of Alexander being pronounced, makes an impression on our ear, and agitates in the *sensorium* the fibre to the vibration of which is attached, in our mind, the idea of Alexander.

This fibre being shaken, shakes successively all those in unison with it, and which were moved simultaneously at the time we read the life of that great captain.

It consequently shakes, round the seat of the soul, the different fibres, the vibration of which renews and revives all the successive ideas that have anteriorly existed in us, on the subject of Alexander, who, we thus recollect, was the son of Philip, enslaved Greece, dethroned Darius, invaded Asia, vanquished Porus, ravaged Egypt, and finally died at the siege of Babylon.

The effort we make to learn by heart, and to retain any thing, shakes successively and repeatedly a series of fibres, that are in unison in the brain, or which, if we may say so, the effort maintains so harmonised and arranged, that the vibration of one of them must put all the others successively in action, and give rise in our mind to so many renewals of ideas or sensations.

In perfect memories, the shaking of one of these fibres communicates the vibration to all the others, because the unison is in them. In faulty

memories there are vacant spaces, because some of the fibres previous to the unison relax, and lose the harmony, and in losing it remain mute and motionless. (L. Para.)

This interior memory, is that which we suppose the blind make use of instinctively. Penetrated with this idea, we carefully avoid, either in teaching them, or even in conversing with them, to make them pass too abruptly from one idea to another, especially when the ideas are dissimilar, and would leave too great a number of degrees among them unoccupied. We endeavour, on the contrary, by proceeding analytically, to connect what we wish to teach them with what they already know, and, to use the theory explained above, always to touch a string that vibrates with another. In this manner, the impressions are profound and permanent. The blind, who, moreover, take their time to do well what they do, always act successively. Nothing shocks them so much, as incoherence. Helvetius pretends that a great memory is a phenomenon of order;* that it is almost entirely factitious, and that, between men well organised, a great inequality of memory is less the effect of an unequal perfection in the organ which produces it than of an unequal attention in cultivating it. According to him, it is to order that the sagacity of the mind is often owing, and the ex-

* *De l'Espirt*, chap. 3, discourse 3.

tant of the memory always. It is also the want of order, an effect of indifference for certain sorts of study, which, in some respects, absolutely deprives persons of their memory, who, in other respects, seem endowed with a most extensive one. The immortal bishop of Hippo said, in this same sense, *ordo ducit ad virtutem.*

The memory of the blind may possibly then be connected with the spirit of order which they generally possess, and to the habit of classing their ideas in their head, in such a manner that they can easily awaken a whole series. We see very few blind who, when insane, are in that state of mental alienation which necessarily implies an incoherence in the ideas, and a total divergency in the functions of the brain. Their concentrated attention is the cause why objects, which would only leave an insensible impression on us, are very strongly engraved on their mind. This faculty, which is conditional, is troubled or weakened in them, as in those who see, by disease, delirium, imbecility, &c. but in a much less degree, and this naturally follows from the principles we have established above. I have had occasion several times to verify this fact, in the different acute maladies in which I have treated them.

It has been said that a great memory is seldom allied with a sound judgment. This assertion, though long since repeated, is far from being

demonstrated: Lesueur, the Massieu of the blind, the first pupil who was instructed by the methods we follow at present, had a prodigious memory, and an exquisite judgment; and almost all the blind I have known, united these valuable qualities to a high degree. I conceive that there may be individuals endowed with a mechanical memory, and without judgment; but I cannot understand how one can have a perfect judgment without memory. *Memory is a tool of marvellous service,* said Montaigne, *and without which judgment can hardly perform its office.** Some persons have carried the faculty of retaining to an almost incredible degree. Seneca informs us of himself, that by a great effort of memory, he could repeat two-thousand detached words, in the same order that they had been pronounced. Muretus relates that a young Corsican had found the art of forming his memory in a surprising manner: he could retain three thousand words, Greek, Latin, barbarous, without any connexion between them, and most of which had no meaning. He recited them in the same order in which they had been dictated to him, descending from the first to the last, and afterwards ascending from the last to the first. He asserted that he could even learn thirty-six thousand with the same rapidity. He taught his method to a Venetian nobleman, whom he put

* Montaigne, book ii. chap. 17.

in a way of doing the same as himself, in a very short time.* We have seen how Feinagle formed artificial memories in our days. But it is not for this species of memory that the blind are remarkable; they are principally distinguished by that which connects itself with facts or ramifications susceptible of being unfolded by judgment and reflexion.

* Muretus, *de quorundam admirabili memoriâ.*

CHAPTER III.

On the Faculties that are developed in the Blind, and of the Pre-eminence of some of these Faculties over those of Persons who have their Sight.

I SHALL have very little to say in order to develope this question, which, in many respects, falls into those we have already treated. I think I have sufficiently proved that the loss of one sense does not turn to the profit of the others, and that nothing can be a compensation to the blind for the loss of the organ of which they are deprived; but if there be no *physical* compensation, Providence has not left them entirely without consolation, and has endowed them with a great fertility of imagination, and much rectitude of judgment.

I shall not speak of Homer, who composed his admirable poems when blind; nor of Milton, who has spoken of light in such a delightful manner at the beginning of the third book of Paradise Lost; nor of our immortal Delille, and so many other illustrious blind; this would be going out of the range I have prescribed to

myself: by such proofs as these, I feel I should weaken my arguments. I have known persons born blind, who were excellent poets, or learned musical composers; I have seen others very clever in business, and who managed their affairs so well that it would have been very difficult to have deceived them.

To prove that the blind have certain qualities which display themselves in a much higher degree of perfection than in those who have sight, is, in other words, to show into what errors the latter are drawn by the sense of sight.

The blind have a great facility of decomposing their ideas, either analytically or sinthetically. Two blind persons, both pupils of this Institution, may be cited as striking examples of this fact: the first is Paingeon, who, by the spirit of order with which he is endowed, has acquired transcendant knowledge in mathematics, and after having gained, in 1806, all the first prizes in the general competition of the four lyceums of Paris, was named, by the Grand Master of the University, professor of mathematics in the Lyceum of Angers, where he teaches with the greatest success; the other is J. Delille, (now in the house of the Quinze-Vingts,) who has carried very far the philosophy of the French language; a perfect steadiness, and an admirable precision in his definitions, are the particular characteristics of this person, whom we are proud of having formed.

This great facility of analysis and decomposition that is observed in those who are born blind is much more intense while they are in a state of nature; we perceive that it grows weaker, when, from ideas that have been communicated to them, they adopt our processes and formulas of reasoning, undoubtedly because acting then like us, with an instrument less than we have, they are badly served. In the first state, on the contrary, they are men with four senses, performing operations like us, and not supposing it to be necessary to have five, any more than we could see how a man would act that had six.

Malebranche, and Berkeley after him, were, therefore, very absurd to maintain, without any proof, the striking idea of a world merely fantastic, and that our senses deceive us in every thing, while it is well proved, on the contrary, that there is no testimony more certain than that which they give us; since, whenever any of these natural conductors is wanting, we are obliged (as in teaching the blind, and deaf and dumb) to create artificial means in order to convey to the mind the ideas which, in the natural state, they are destined to convey to it.*

* A company of five persons, each with only one sense, would be very amusing; there is no doubt but they would all look on each other as madmen. The more peculiar notions any one sense possessed, the more extravagant would it appear to the others: the result would be, that the most

With respect to their physical perfection, nobody disputes their pre-eminence over us in the exactness of the perception of their ideas by feeling, that sense so eminently exact, which rarely deceives, and which Buffon, therefore, called *a geometrical sense*. We know to how many mistakes our sight exposes us; and how often we are obliged to join feeling with it not to be deceived; this, however, is not always practicable, and we are often deluded by the information of our eyes.

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extravagant among them would infallibly think himself the wisest; that each sense would scarcely be contradicted but in what it knew best, and that they would be almost always four against one. (Diderot, *Letters on the Blind.*)

CHAPTER IV.

Moral State of the Blind;—Nature of their Ideas.

Touched with that compassion which the misfortunes of others excite in all men of feeling, every one is eager, from a very laudable curiosity, to be informed of the moral state of the blind. We are desirous to know if, on many things they have the same ideas as us; what are the natural sentiments which affect their minds, and if they are feeling and grateful. We enquire if they are active and curious; if they are susceptible of *ennui;* what are the ideas they form of ugliness and beauty; if they have the same opinions as we on good and evil, and on our acquired ideas; if the disposition to atheism with which they are reproached is founded or not; in short, what are their tastes, habits, and defects?

However wide may be the circle of these questions, I shall endeavour to answer them succinctly, without entering into a crowd of details foreign to my subject, and which moreover belong to metaphysics; I shall confine myself to what experience and observation have taught

me; happy if I can excite towards those unfortunate beings, whose history I write, that tender interest which they inspire in me, and which so strongly attaches me to them!

The want of sight not only deprives the blind of the sensations which that organ gives to those who have sight, but also extends its influence over all their thoughts, which it modifies and distorts; all their ideas, therefore, are false or contrary to the notions we have, because, as Condillac has well observed, coloured nature has no existence for them; it is blindness which plunges them in the ignorance in which they are of decorum, and which deprives them of the sentiment of social decencies. Modesty, which is one of the graces of youth, is to them almost an imaginary being, though they have a sort of timidity, which, it is true, belongs perhaps rather to fear than shame, but which greatly augments their embarrassment in certain circumstances.

Unfortunate in all their relations with other men, they are very imperfectly acquainted with those emotions which draw us towards each other, and decide our affections and attachments. Sensibility has not, for them, those charms which make us place it in the rank of the sweetest as well as the most amiable virtues. Unhappy creatures! their situation, which forces them to be on their guard against all the world, makes them often place in the same class their benefactors and their enemies; and without

meaning it, perhaps, they appear ungrateful. It is these motives which make them form connexions with the blind rather than with those who have sight, whom they consider as a different class of beings. Is it that they apprehend our inconstancy, or distrust our superiority, or else find more points of association among each other?

They will easily be excused, when we reflect on the number of signs that are lost to him who is deprived of sight. Those external motions, which are painted so expressively on the countenance, that faithful mirror of the soul, do not exist for them. They are continually, in their relations with other men, as one is with an individual whom one knows only by correspondence: we know perfectly well that he exists, but we cannot conceive how.*

If not very openhearted, on the other hand, nature gives them an ample compensation by endowing them with a prodigious activity of imagination and an insatiable desire of know-

* As of all the external demonstrations which excite in us commiseration and ideas of suffering, the blind are only affected by complaint. I suspect them, in general, of inhumanity. What difference is there, to a blind man, between a man who makes water, and a man who without complaining is bleeding? We ourselves, do we not cease to feel compassion, when the distance, or the smallness of objects, produces in us the same effect as the privation of sight does in the blind? (Diderot, *Letters on the Blind.*)

ledge, which, in them, is a substitute for many affections that they want, or at least for the expansion which such sentiments might have. This state of their imagination banishes *ennui*, which is one of the least inconveniencies of blindness; for we meet with very few blind persons who have not formed some sort of occupation for themselves, and with complete success.

Obliged to judge of men and things intrinsically, they must necessarily obtain truer results than us: moreover, as I have repeatedly said, they see things in a more abstract manner than we, and in questions of pure speculation are less subject to be deceived; for abstraction consists in separating in thought the sensible qualities of bodies from each other, and error commonly springs from a defective separation. They have no need, like us, to guard themselves against the illusions of the senses, since they cannot be seduced by appearances: the charms of the countenance, the richness of clothes, the sumptuousness of apartments, the dignity of office, and the prejudices attached to birth, are nothing to them: it is the moral man whom they appreciate. How much more certain must their judgments be, in this respect, than ours!

A soft and sonorous voice is to them the symbol of beauty. They know pretty exactly, by the compass of the voice, what is the stature and size of the person who speaks, the largeness of the room they happen to be in, &c. But with

what nicety of discernment must these attentive observers judge, by this means, of the temper and of certain shades of character which escape us, because we have not the same interest in remarking them? By a sort of anticipated intuition, they see the soul through its covering.*

There are, in fact, more relations than has hitherto been supposed between the divers degrees of the vocal organ and the disposition. In this point of view, one might form a curious comparison between animals and man, by forming the first link of the chain by those savage beasts, the terror of the forest, and continuing it down to those peaceable animals who are born in our enclosures to feed and clothe us. This study, very worthy of a philosopher, would lead, I am persuaded, to some useful results.

The blind have been accused, in general, of atheism very unjustly. Those who have advanced this strange assertion, were either not sincere, or had some interest in propagating an error which might prop up some others. Why give such an idea of those who have the greatest want of the consolations which religion showers on the unfortunate and unhappy? Do

* Sir John Fielding, a relation of the author of *Tom Jones*, who lived in our time, was blind; but this did not prevent him from filling, with great distinction, the place of *chief magistrate of the police office*, in London. He kept in his mind the description of many hundred thieves, and was never mistaken when they were brought before him.

they not know in part the works of the Creator? The taste of fruits, the sweetness of flowers, the song of birds, and the vicissitude of the seasons; must they not make them sensible of the existence of the admirable architect of the universe?

Nevertheless, I will not justify them entirely from the reproach of impiety, which has been made against them with some foundation. I am more convinced than any body that that law, anterior to all sensible impressions, which God gave to man on drawing him out of nothing, is engraved in their hearts; but I am obliged to confess also, that they do not always follow the impulse of that interior voice, which approves and consoles when we do good, and torments and gnaws when we do evil: conscience, in short, has not that influence over their actions which it has over ours. It is easy to deduce the consequences that flow from a similar state, and what may be their ideas on good and evil, and on the notions we have acquired.

I have never known a blind atheist; but if we happened to meet with one so unfortunate as not to acknowledge the Creator in his works, we might repeat to him what Dr. Holmes formerly said to the celebrated Saunderson, who had expressed some doubts on this point: *Put your hand on yourself, the structure of your body will dissipate so gross an error.*

Like us they wish for what is the most difficult

to obtain. All blind people have a decided taste for independence and liberty. Nothing, however, is more contrary to their real interests than the use of a thing which they could only abuse. The art of those, therefore, who are with them, consists less in satisfying them than in making them believe they are satisfied. By this means we avoid exasperating the natural defects they may have, all of which appertain more or less to their infirmity, which cannot be imputed to them as a crime.

Their self-love, which is the most prominent of all their defects, and, perhaps, the origin of all the others, is compensated by some valuable qualities; their invincible patience and extreme tenacity in their enterprises, render them capable of surmounting the greatest obstacles without ever being disheartened.

CHAPTER V.

Parallel between the State of the Blind and that of the Deaf and Dumb.

People are constantly asking us, which are the most unhappy, the deaf and dumb, or the blind? To what is the gaiety of the one and the profound melancholy of the other owing? We shall resolve this question to the advantage of the blind, because we really think them less unhappy.

Strangers to all that passes around them, the deaf and dumb, who see every thing, enjoy nothing. Like Tantalus, whom fiction represents as devoured by an inextinguishable thirst in the midst of water, they are continually subjected to cruel privations. An insurmountable barrier separates them from the rest of mankind; they are solitary in the midst of us, unless we know that artificial language which the talent and charity of their ingenious teacher has created for them; and the habit which they have of reading the countenance is even very often a subject of anxiety to them. They do not always guess right; doubt and uncertainty increase their impatience and suspicions: a serious cast, like

melancholy, then invades their countenance, and proves that with us they are in a real state of privation. Obliged to concentrate their thoughts in themselves, the activity of their imagination is thus greatly increased; and as attention and judgment necessarily follow the perception of ideas, they fatigue themselves prodigiously. Few deaf and dumb persons, therefore, are to be found in the lists of longevity, because the frictions are too lively, and to use a common, but exact expression, the sword wears the scabbard.

The blind, more favoured than these children of silence, enjoy all the means of communication with other men. No obstacle hinders them from hearing or being heard, since the ear, which has been so philosophically defined the vestibule of the soul, is always open to them. The exchange is rapidly made, because they speak the vulgar language. Though condemned to live in profound darkness, their infirmity, in a manner, turns to their advantage, because being secure from the illusions of the sight, they are not, like us, assailed with fright: all the phantoms created by the exaltation of our imagination are unknown to them.

They walk with equal security both by day and night; while we, constantly exposed to form false judgments of the objects that present themselves to our eyes in the different situations in which they are placed, cannot deliver our-

selves entirely from the sort of internal fear which the darkness of the night makes almost every man feel, and on which is founded the apparition of spectres and frightful figures which so many people say they have seen.

It would be easy to prove that the blind have several other advantages over the deaf and dumb; but it would be exposing myself to repeat, without much advantage, what I have already said: besides, would it not be idle to insist too long on a parallel between dumbness and blindness, when we can have no choice between these afflicting mutilations, which we can only lessen by attention when they exist?

PART II.

BIOGRAPHY OF BLIND MEN WHO HAVE BEEN ILLUSTRIOUS IN THE SCIENCES AND ARTS.

CHAPTER I.

Of Blind Men illustrious in the Sciences.

History has preserved the remembrance of blind persons, who acquired great knowledge by themselves before there existed any method of instruction for them. Their number is considerable; but I shall confine myself in this chapter to point out the most remarkable, and to indicate the authors I have consulted; for the more extraordinary things are, the more authenticity should be given to them. I have thought that this short biography of celebrated blind persons would be agreeable to the reader, and would serve at the same time to prove the utility of the present mode of instruction, in which the various methods invented, down to the present time, have been collected together and methodi-

cally arranged. We shall see in the third part of this work the improvements they have undergone, and with what ease the blind are now instructed.

The number of the blind was very considerable in Asia and Italy in the time of the Romans. The great number who wrote at that epoch on the diseases of the eyes might serve as a proof of this;* but the mode of instruction employed in those times has not reached us.

Diogenes Laertius and Thrasylus relate,† that several philosophers deprived themselves voluntarily of their sight, in order to meditate more freely. Among others, they quote Democritus, of Abdera. But is it probable that this philosopher, who laughed at every thing, blinded himself in order to philosophise, which can be done just as well with the possession of one's sight? The testimony of a great man may sometimes give credit to the most absurd fables; and it was probably Cicero who gave some con-

* I endeavoured to demonstrate the truth of this assertion, at the opening of my Lectures on the Diseases of the Eyes, delivered at the Institution in 1816. A very interesting dissertation on the antique stones which the oculists used for seals, by M. Tochon d'Annery, Member of the Institute, proves also that there were many apothecaries or empirics in Italy, who sold remedies against the complaints of the eyes, (Κολλουριον) contained in earthen vases, of which that learned academician has given a description.

† Diog. Laert. lib. ix; Vossius, De Philosoph. chap. 11.

sistency to this:* for I think it would have been unworthy of a philosopher to treat himself as a criminal, and crucifixion and privation of sight were, in those times, punishments reserved for criminals.

The Roman orator says that Diodotus, his master of philosophy, applied with more assiduity to the study of that science after having lost his sight; and, what appeared to him a prodigy, he taught geometry with so much precision, that his disciples had not the least difficulty to understand how they were to trace the most complicated figures.†

Historians relate things of Diodotus, the Stoic, calculated to excite the greatest admiration. He was at once a philosopher, a musician, and geometrician; but, what they say will appear incredible, though he never saw, he taught geometry so well, that he left nothing unexplained to his numerous disciples.‡

Aufidius, a Roman citizen, who lost his sight in his youth, was not the less distinguished in the pursuits of literature, and even wrote a Greek history.§

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* Democritus impedirix etiam animi aciem aspectu oculorum arbitrabatur. (Cicero, Tuscal. Disp. v. 39.)

† Id. Ibid.

‡ J. Zahn; Speculæ physico-mathem. histor. tom. iii. cap. 6.

§ Id. Sens. extern. Mirab. Sect. 2.

Eusebius, the Asiatic, having become blind at the age of five years, acquired great knowledge and profound erudition, and lectured with great facility.*

St. Jerome has left us the history of Didymus, of Alexandria, his master, of whom he speaks with the greatest respect. This illustrious blind man, who lost his sight at the age of five years, flourished in the fourth century. Rufinus, Paladius, Isidore, and several other celebrated men, were his disciples. He acquired vast knowledge by having the sacred and profane authors read to him; was one of the most able mathematicians of his time; and applied himself especially to theology, for which he had a particular taste. The professorship of the famous school of Alexandria was confided to him. He composed several excellent works, the chief of which is his Treatise on the Holy Ghost, translated into Latin by St. Jerome. Didymus was as pious as learned; nevertheless, his attachment to the opinions of Origen, whose books he had commented, caused him to be condemned, after his death, at the council of Lateran. St. Athanasius and St. Anthony had the greatest esteem for him. He acknowledged one day to the latter the affliction he felt at being deprived of his sight; when the holy hermit made him the following answer:—

* Cassiodorus, de Inst. div. litter. cap. 5.

"I am astonished that so judicious a man as you should regret a thing which is common to the most contemptible animals as well as to man, and that you are not delighted to possess one which is only to be found in saints and angels, by which we see God himself, and which lights in us the flame of such a luminous science." Didymus died in 398, aged eighty-five years.*

Nicaise, of Molines, was in great reputation, in the fifteenth century, from the extent of his knowledge. It was considered as a prodigy, that being blind from the age of three years, he could perfect himself so much in the study of the most sublime sciences. He taught the canon and civil law publicly in the university of Cologne, and quoted from memory long passages which he had never seen. Having been chosen a doctor of Lovain, the Pope allowed him to be consecrated a priest. He employed the rest of his life in preaching, and died at Cologne in 1492. Urithme and Valere have made mention of him in the *Bibliothque des écrivains des Pay-Bas.*

Tiheckius (James,) born at Thorndorf, in the Duchy of Wurtemberg, taught philosophy and medicine, at Tubingen, for thirteen years, with great success. When he lost his sight he was

* Hyeron, de ver-illustr., cap. 109.—Socrates, lib. 4, cap. 25.—Rufinus, lib. 2, Eccles. Histor. cap. 7, et Platina.

so little affected by it, that he refused the assistance of an oculist who offered his services. He said *he had seen many things in life he would rather not have seen, and would even have wished on some occasions that he had been deaf.* He published several treatises on divers points of philosophy, medicine, and controversy. He died at Tubingen, in 1587.

Fernando (John,) born in Belgium, whose father was a Spaniard, and very poor, was blind from his birth; he surmounted these two great obstacles to literary advancement, and became a poet, logician, and philosopher, and even so excellent a musician, that he would compose pieces out of his head, equal to those of the first musical composers.*

Ascanius (Perdianus,) an historian, who lived several years without sight, wrote, notwithstanding, with great elegance, treatises on grammar, in which there is no trace of his infirmity.†

We read in the annals of the town of Prague, that a blind Scythian, whom Charles IV., Emperor and King of Bohemia, met near Nuremberg, before he was elected, recognised him, though he was disguised, and answered with great propriety all the questions he put to him on the succession of the kings of Bohemia, and

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* Zahn, p. 114. † Fulgosus, lib. 8, cap. 7.

on the state in which the kingdom would be in future. What has been said of that prince, who ruined his house to gain the empire, and then ruined the empire to re-establish his house, is only a paraphrase of the last answer of the blind Scythian.

Schomberg, (Uldaric,) born in Germany about the beginning of the seventeenth century, who became blind at three years old with the small pox, devoted himself, notwithstanding, to the pursuits of literature, which he taught with honour at Altorf, Leipsig, Hamburgh, &c.*

Bourchenu de Valbonais, born at Grenoble in 1651, became blind very young, a short time after the naval fight of Solbaye, where he was present. This accident did not prevent him from publishing a History of Dauphiny, in two volumes folio. He had made profound researches concerning his country, and also published a List of the Nobility of Dauphiny.†

Saunderson, (Nicholas,) was born in 1682, in the province of York. To name this illustrious blind man, is almost to have told his history, his extraordinary talents having been so famed for near a century.

He went through his classical studies very well, and was drawn by inclination to the study

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* Harknock's alt und, neu Preussen, 1648.

† Feller.

of mathematics, of which, from the smallness of his fortune, he was obliged to give lectures that were well attended. He spoke to his pupils as if they had been blind, which must have given him a great advantage over them. He explained the works of Newton on light and colours. I shall mention later what is the nature of such demonstrations which appear miraculous.

Whiston having abdicated the Professorship of Mathematics at Cambridge, Saunderson was named his successor, in 1711. It was at this period that he published his Elements of Algebra, an extraordinary work, and full of singular demonstrations, which a man with sight would not, perhaps, have imagined.

He invented a palpable arithmetic, and a board pierced with holes, in which placing pegs or pins of different sizes, that had a different value according to the place they occupied, he performed with facility the most complicated operations. The reader will be gratified, I imagine, to find here the figures of these boards, and the description of them by Hinchcliff, the pupil, friend, and successor of Saunderson, in the work which he published at Dublin, in 1747.

His board for calculating was thin and smooth, and rather more than a foot square; it was fixed in a little frame, the edges of which were raised a very little above the board, which contained a great number of parallel lines of the same number, forming right angles with the

first. The edges of the board had grooves, at the distance of about two inches from each other, and to each groove belong five of the parallels we have mentioned, each square inch being divided into one hundred small squares. At each point of intersection, the board is pierced with a little hole destined to receive a peg: for it was by means of these pegs that he expressed the numbers. He employed two sorts of pegs, or pins, of different sizes; at least their heads were different, and were easily distinguished by the touch. He had a great quantity of these pegs, in two boxes, that were always before him, the points of them being taken off. Let us now see what use he made of the pegs and the board.

For this purpose we shall first observe, that each numerical character has, in the board, its particular square, composed of four other small contiguous squares, described above, and which, by that alone, left a small interval between each character; and this character was different, according to the difference of size or situation of one or two pegs, of which it was always composed. He had formed the following system: a great peg in the centre of the square, (and this was its only place,) signifies a zero; I shall, therefore, designate it by that name; its principal function consists in preserving the order and the distance between the characters and the lines. This zero is always present, excepting

TABLES of SAUNDERSON.

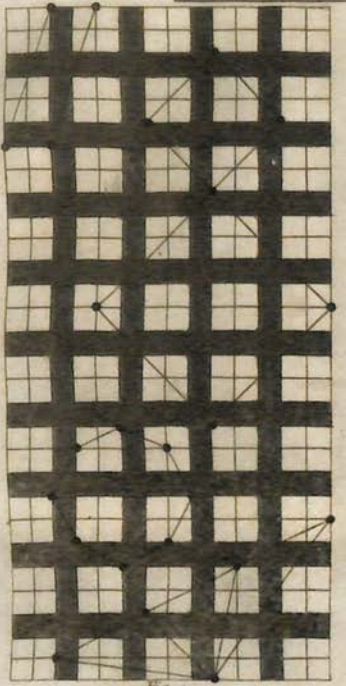

Fig. 4

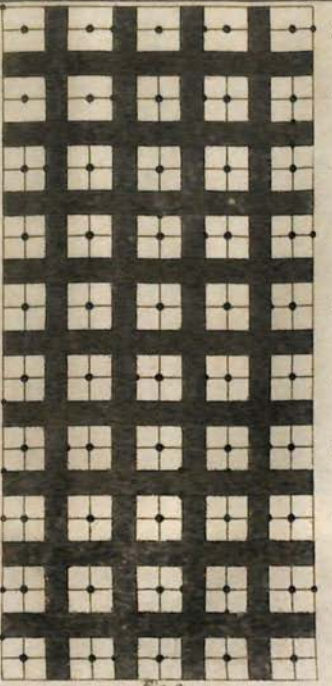

Fig. 3

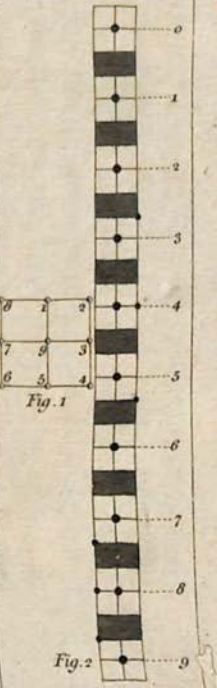

Fig. 1

Fig. 2

ROYAL ASIATIC SOCIETY LIBRARY OF THE BOMBAY BRANCH

in the only case where the unity is to be unmarked, which is expressed by the substitution of a small peg, in place of the large one in the centre. If two is to be expressed, the zero must be put back in its place, and the little peg placed precisely above it. To express three, the zero must remain where it is, and the small peg be fixed to the superior angle towards the right. To express four, the small peg descends and follows the zero immediately. To express five, the small peg descends as far as the inferior angle to the right. To express six, the little peg must be below zero. To express seven, the place of the small peg is the inferior angle to the left. To express eight, the small peg ascends to the level of the zero. In fine, to express nine, the small peg occupies the superior angle to the left.

By this invention the ten numerical characters could be known without trouble, by means of the touch alone. But that the reader may form a more distinct idea of these characters, it will be sufficient to cast his eyes on plate 1. fig. 1 and 2.

The great pegs, or zeros, which are always in the centres of the small squares, and most commonly at equal distances from each other, served him for guides to preserve his line, to fix the limits of each character, and to prevent all the other mistakes that might have happened. As three of the perpendicular parallels suffice for a

single character, three of the horizontal parallels suffice for another line, and so on without any danger of confounding them. In this manner, he would have at once on his board some lines of characters one above another, and, consequently, divide with ease one number from another. Besides, he placed and displaced his pegs with inconceivable quickness.

The patterns of this arithmetic, reduced to vulgar numbers, consist in arithmetical tables, which he had calculated and kept for his own use. But one cannot conjecture what object he had in view in calculating them. They seem to have some relation with the tables of natural sines, secants, and tangents, and consist of four pieces of solid wood, having the form of rectangular parallelipipeds, and about eleven inches long by five and a half broad, and sometimes half an inch thick. The two opposite faces of each of these parallelipipeds are divided into small squares, precisely like the board described above, but have holes only in the necessary places, the pegs being fastened. Every face contains nine little arithmetical tables, each of ten numbers, and each number is composed of five characters.

The figure, No. 3, is the model of an addition, the numbers of which are represented on the right side: the same board became, if wanted, geometrical, and served to demonstrate the

properties of rectilinear figures. He placed each of his pegs, or pins, in the angular points, and by surrounding them with a silk thread, he made all the figures apparent which he wished to form, as is seen on *the figure*, No. 4. By means of the table we now use at the Institution, and the cyphers that have been contrived, the blind calculate in the same way as those who have their sight, and without any arbitrary convention.

Saunderson's touch was so perfect, that by running over a suit of medals he could distinguish the true from the false. He perceived the least vicissitude of the atmosphere. Assisting one day at some astronomical observations, he perceived whenever a cloud passed between the sun and him; which was the more extraordinary, as he was not only deprived of sight but even of the organ.

He had some good qualities; but his morals did not correspond with his talents: he is even reproached with some shameful excesses, unworthy of a great man. He died at Cambridge, in 1739, at the age of fifty-six.

Sir Henry Moyes, a Scotchman, who lived in our days, lectured extremely well on the Newtonian philosophy. He was a good chymist and musician, and an excellent mathematician.

Dr. Blacklock, of Edinburgh, born blind, is considered in England as a good poet.

Pfeffel, of Colmar, who lost his sight when

very young, in consequence of a violent ophthalmia, has composed some very pretty poems, principally fables,* some of which have been translated into French by Degerando. He was privy counsellor of the Margrave of Baden; and established at Colmar, a military school, where people of the first families sent their children. The prince of Schwartzenberg and the Prince of Eisemberg, who were brought up there, are proud of having had this learned blind man for their master. M. Heilman, now a pensioner of the Quinne-Vingts, was also his pupil, and does him the greatest honour. M. Pfeffel died at Colmar, in 1809.

Weissembourg, of Manheim, became blind at the age of seven. He wrote perfectly well, and read with characters he had contrived for himself, before he had ever seen any. He was an excellent geographer, and composed maps and globes, which he used for studying geography. He had also invented an arithmetical board, which differs but little from that of Saunderson.†

The blind Du Puiseaux is too well known to render it necessary to enter into many details concerning him. Every body has read Diderot's Letter on the Blind, and is acquainted with the

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* 6 vols. 8vo. Colmar, 1791.

† Journal de Paris, April, 1784.

knowledge of that extraordinary man. He was the son of a professor of philosophy in the University of Paris, and had attended, with considerable proficiency, the lectures on chemistry and botany, in the king's garden. After having dissipated a part of his fortune, he retired to Puiscaux, a little town in the Gatinais, where he established a distillery of liqueurs, which he used to go and sell every year himself at Paris. He was original in all he did: it was his custom to sleep during the day, and rise in the evening: he worked all night, because, he said, then he was disturbed by nobody. When his wife got up, she found every thing perfectly well arranged. He spoke very sensibly of the qualities and defects of the organ he wanted, and answered with great exactness the questions that were put to him. Being asked what idea he had of a looking-glass? "It is a machine," said he, "which places things in relief far from themselves, if they are properly placed with respect to it. It is like my hand, which I must not put by the side of an object when I want to feel it." He put some whimsical questions on the transparency of glass, on colours, &c. to Diderot, who visited him at Puiscaux. He asked if it was only naturalists who could see with the microscope, and if astronomers were the only people who saw with the telescope? if the machine which enlarges objects was bigger than that which diminishes them? if that which brings

them nearer was shorter than that which makes them farther off? He thought that astronomers had their eyes differently formed from other men, and that one could not pursue the study of such and such sciences without eyes that had particular faculties for that purpose. "The eye," said he, "is an organ, on which the air should have the same effect as my stick on my hand."

He had the memory of sounds to a surprising degree, and recognised by their voice persons whom he had only heard once. He could tell if he was in a street or a blind alley, in a large or a small room. He estimated the nearness of fire by the degree of heat; the fullness of vessels by the noise which the liquid poured into them makes in falling; and the nearness of bodies, by the action of the air on his face. I know a blind man at the Quinne-Vingts, (Levé,) whose hearing is so perfect, that on going into his room, he can perceive if any of his furniture has been displaced, any curtain taken down, &c.

Somebody once asked du Puiseaux, if he would not be very glad to have his sight? "If it were not for curiosity," said he, "I would rather have long arms; it seems to me that my hands would teach me better what is passing in the moon than your eyes or your telescopes; and besides, the eyes cease to see sooner than the hands to touch. It would, therefore, be as

well to improve the organ I have, as to give me the one I want."

Being out of humour one day with the questions which inquisitive persons were making him: "I perceive very well, Gentlemen," said he, "that you are not blind; you are surprised at what I do; why are you not astonished to hear me speak?"

He made use of characters in relief, to teach his son to read, who never had any other master.

HUBERT, of Geneva, an excellent naturalist, author of the best History of Bees and Ants. On reading the descriptions which this learned blind man has given of those insects, one would suppose them to be the composition of a clear-sighted man, very well versed in this branch of natural history; Hubert, however, had no other assistant in this great work, but his servant, who told him the colours of the insects, whose form and size he afterwards perceived by the touch, with the same ease as he knew them by their buzzing when they flew in the air. This laborious writer has also published a work on education, very much esteemed.

LESUEUR, (Francis,) born at Lyons, the 5th of August, 1766, of very poor parents, lost his sight at the age of six weeks; he went to Paris in 1778, and begged at a church-door, when M. Haüy, discovering he had a disposition for study, took care of him and taught him, pro-

mising him a sum of money equal to what he got by charity.

Lesueur began to study in October, 1784. Six months after, he could read, compose with characters in relief, and print; and in less than two years had learned the French language, geography, and music, which he knew very well, for his intelligence and penetration were wonderful. This astonishing young man was for the blind what Massien afterwards was for the deaf and dumb. He was successively repeater to his companions, head of the printing concern, and steward of the Institution. He died a few years ago, a pensioner of the Quinne-Vingts.

It is painful for us to say, that Lesueur was ungrateful towards his benefactor and master, to whom he owed every thing, and that he deserved, from his conduct, the reproach of ingratitude, which is made, with some foundation, against all blind persons.

Arisse, born at Paris, was one of the most distinguished pupils of the Institution. His father, who kept a furnished hotel in the *rue Guénégaud*, destined him for the sea. He went, when very young, on board a vessel that was a slave-ship, in the quality of secretary to the captain. He was struck by a blast of wind on the coast of Africa, and lost his sight by a violent inflammation that followed.

His parents got him admitted into the Insti-

tution for the blind, where, in a few years, he became professor of grammar and logic. He wrote a comedy in one act, and in verse, entitled *La Ruse d'Avengle*, which was acted in Paris; also a scene in verse, the title of which was *L'Atilier des avengles-travailleurs*, and several other pieces, printed in 1 vol. 12mo. second edition, 1803. He died scarcely thirty-one years old, regretted by his family and friends, at the moment when he gave the greatest hopes.

Were we not afraid of hurting the modesty of several blind men now living, we should have cited with pleasure M. le Chevalier Pougens, who is now concluding a great work begun at Rome in 1777, which contains the most curious and most interesting researches on the origin of the French Language; M. Isaac Roques, of Montauban, the more surprising, as he formed himself; and many others, chiefly pupils of this house.

CHAPTER II.

Of the Blind who have distinguished themselves in the Practice of the Arts.

The number of the blind who have distinguished themselves in the arts is almost as great as of those who have excelled in the study of the sciences. It is not less surprising to see these unfortunate beings, deprived of a sense so necessary to the exercise of the arts, succeed perfectly in divers mechanical professions, and to a certain degree, rival those who have sight, in promptitude and dexterity. If we except painting and the application of colours, there are few things they cannot do, either singly or together, especially when they are directed by well-informed and intelligent persons who have their sight.

It is very desirable, therefore, that the repugnance people have to employ the blind could be got over, and that they might be employed in the different works in which they succeed. It would be at once an act of charity, and a means of improvement for them, which would turn to the advantage of those who employed them.

We shall now give a succinct account of the blind the most distinguished in the arts, as in the

preceding chapter, and thus complete the biography of celebrated blind men.

Stengel relates, that in 1602, a young cabinet-maker at Ingolstadt, who was polishing a bronze tube, inadvertently laid it down on some powder, which exploded and destroyed his sight. He was carried to an hospital full of old infirm people, where he fixed himself in a retired spot, in order to work at his ease, and formed a little room of boards round his bed, which he decorated with pictures. He afterwards made, without any other instrument than a coarse knife, two pepper-mills, with wheels and teeth, and every thing necessary for grinding. One of these mills was so well made, that it was judged worthy of being sent to Munich to be placed in the museum among other rare and curious things, and where it may be seen at this day.*

Sir Kenelm Digby relates some extraordinary things of his son's tutor, who was so completely blind that he did not perceive the light of the sun. He could beat the cleverest chess-players, and knew almost all other games. He went, without a guide, all through the house, and sat down at table with so much ease and confidence, that it was impossible for strangers to perceive he was blind. When he heard any body speak for the first time, he was never mistaken with

* Laurentius Stengelius, lib. de Monstris, cap. 16, § 10.

respect to their size and shape. When his scholars were reciting before him, he could tell what posture they were in, and what gestures they made, and could easily distinguish a dark day from a clear one.

We have already observed, in speaking of Saunderson, that the blind (those even in whom the organ is destroyed) distinguish light from darkness, and a fine summer day. Those who have preserved the globe of the eye, but do not see, *amauroties*, for example, call this *un point de vue.* They think themselves very happy with this advantage, which is much envied by their companions in misfortune, though it is of no use to them. On what can this extraordinary phenomenon depend, which we observe every day in this house? It is difficult to tell; for we are far from thinking that the blind see by the skin, as a modern philosopher has asserted, who certainly was no great physiologist.

A butcher of Bologna, mentioned by Aldrovandus, could tell by the touch the weight of the beast he had to kill. He knew weights and monies; rode on horseback, and performed all the other business of a butcher.

De Piles saw in Italy a blind man, about fifty years old, full of genius and intelligence, and an excellent drawer. He met him in the Justiniani palace, modelling in wax a statue of Minerva. This man could, by the touch, discover precisely the forms and proportions of the originals.

The Duke of Bracciano, who saw him at work, had some doubts of his being completely blind; and to be certain of it, he made the blind man take his picture in a dark cave; but it was a perfect resemblance. It being objected to him that the duke's beard helped him to know him, he offered to take the portrait of one of his daughters, which he also drew perfectly like.

I saw, says De Piles, by this famous blind man, the portraits of the late King of England, Charles I. and of Pope Urban VIII.; and in France, that of M. Hesseelin, all perfectly well executed. He found some difficulty in representing hair, because it is moveable, and all his art was in drawing.

We have seen in our days, M. Baret, one of the ablest sculptors in the academy, who, falling blind at the age of twenty-five, in consequence of the small-pox, did not cease working.*

Gambasius, (John,) of Volterra, lost his sight at the age of twenty, and remained ten years in that state, without having the least knowledge, even of the elements of sculpture. All at once, he felt a desire to try and make a statue, and having felt all over a marble statue, which represented Cosmo de Medicis, he made one of clay, so like as to astonish every body who saw it.

* Derbyshire lately afforded an example of a blind surveyor and able constructor of roads. Translator.

His talent for statuary improved so much, that *Prince* Ferdinand, Grand-duke of Tuscany, sent *him to Rome to model* the statue of Pope Urban *VIII.* which was also very like. He afterwards made many others with equal success.

A Dutch organist having become blind when very young, was only the more expert in his profession. He acquired besides the habit of distinguishing by the touch, different kinds of money, and even colours:* those of playing cards could not escape the fineness of his fingers, and he became, by that means, a formidable player, for in handling the cards he knew those which he gave to others as well as those he kept for himself.†

CHAUVET, born blind, was for several years organist of Notre Dame de Bonne-Nouvelle, at Paris. The amateurs of good music were always eager to have him.

Miss PARADIS, of Vienna, who lost her sight at the age of two years, in consequence of an apoplexy, was the admiration of all Paris at the spiritual concert in 1784. She had a great

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* I shall mention hereafter how the blind ascertain some colours; but it is not by the touch. Boyle was wrong in saying of a man at Maestricht, from testimony undeserving of credit, that he distinguished colours by the touch, which is impossible. The blind do not discover the colour, but the effect which it produces on coloured bodies.

† Lecat, Treatise on the Senses, p. 11.

talent for composing, and had found a means of writing herself what she composed, by figuring the harmony. She first began with cards, which she pricked with needles; but this first attempt proving unsuccessful, suggested to her the idea of another process, our ignorance of which we regret the more, as it was infallible, and of easy execution.

Among the objects of curiosity in the Museum at Copenhagen, are medals struck by the blind, and a supurb sideboard of ivory and ebony, made by a Norwegian artist, who was blind.

In Italy one frequently meets with blind people, who offer travellers pretty baskets, which they make with rice-straw, and beads that are made with cherry-stones, very prettily worked.

I saw a milliner's shop at Paris, where blind girls, directed by a mistress who had her sight, made gowns and other sorts of work. In the *Ephemerides Naturæ Curiosorum*, is a history of a blind man, of Wurtzburg, who sewed very well. At Halberstadt also, there was a blind man, who, among other tricks, would thread a needle perfectly well.*

* Ephem. Germ. cur. dec. secundo anno. 1, obs. 71.

PART III.

OF THE INSTRUCTION OF THE BLIND.

FIRST SECTION.

CHAPTER I.

Origin of the Paris Institution.

It was a fine thought of that monarch, who, on his return from a war which he thought necessary for the glory of religion, instituted an asylum for three hundred knights who had lost their sight in Egypt.* This house, owing to the piety of Louis IX., escaped the revolutionary vandalism, and still subsists at this day, under the denomination of the Royal Hospital of the Quinze-Vingts: three hundred poor blind persons, of all ages, successors of the three hundred

* In 1260, the Quinze-Vingts were then in the *rue Saint Honoré*, facing the *rue de Richelieu*. In 1780, the Cardinal de Rohan, then Grand-almoner, had them transported to the ancient hotel of the *Mousquetaires Noirs, rue de Charenton, faubourg St. Antoine*, where they now are.

knights, are maintained and lodged there, at the expence of the state.

The creation of the Institution of the Young Blind, by Louis XVI. under very difficult circumstances, excites, perhaps, more admiration than that of the Quinze-Vingts. Louis XVI. owed nothing to the young blind; St. Louis was bound by gratitude towards those, who having abandoned their country to follow him into Asia, had participated in his reverses and bad fortune.

The generous heart of Louis XVI. pityihg the lot of the young blind, had no other motive than to snatch from wretchedness, and from the contagion of vice, unfortunate beings, whose only crime was the misfortune of their birth. His noble mind suffered at the sight of so many of his subjects being exposed to want, and forced, in order to prolong a painful existence, to implore the compassion of the public: he thought their situation would be meliorated by affording them instruction,—and the Institution was created.

Penetrated with gratitude for this benefit, we have neglected nothing to fulfil the wishes of the founder. It will appear, from the following exposition of the studies and labours of the young blind, and from the augmentations and meliorations, made by our predecessors as well as ourselves, whether we have done all that depended on us, to render the establishment confided to us worthy of its royal origin.

If we had not already, in different parts of this work, spoken with sufficient detail, of the manner of instructing the blind, we should have prefixed to this third part a special chapter on the mode of instruction to be followed; but this mode being only the application of the processes we are going to describe, we have preferred reserving for each of the following chapters the observations which the practice of teaching has given us occasion to make, in order that there may be more connexion and precision in the details.

The order and distribution of the chapters are indicated in the following table, which is conformable to the progression we observe in the studies and works.

FIRST SECTION.

Instruction.

Chapter I. Of characters in relief, and of reading.
II. Of the impression of books in relief.
III. Of books for the use of the blind.
IV. Of writing.
V. Of geography.
VI. Of languages.
VII. Of mathematics.
VIII. Of vocal and instrumental music.
IX. Of the means of communication between the blind and the deaf and dumb.

SECOND SECTION.

Manual Labours common to both Sexes.

Chapter X. Of manual labours in general.
XI. Of knitting.
XII. Of spinning.
XIII. Of purses.
XIV. Of string and girths.
XV. Of slippers of the list of cloth.
XVI. Of carpets of list.
XVII. Of woollen socks.
XVIII. Of whips.

Manual Labours peculiar to the Boys.

Chapter XIX. Of weaving.
XX. Of straw-bottoms for chairs.
XXI. Of rope-making.
XXII. Of the basket trade.
XXIII. Of mats of straw, rushes, &c.
XXIV. Of some games peculiar to the blind.
XXV. Conclusion.

Some other trades which had been attempted for the blind, such as the art of making models in plaster and wax, the binding and boarding of books, the manufacture of cloth, joining, &c. have been given up, either because they were too difficult to learn, or because they would not have been very useful.

CHAPTER II.

Of Characters in Relief, and of Reading.

ALL those who have wished to instruct the blind, and have performed it with success, were convinced of this truth, that the objects we wish to make them acquainted with, and the form of which those who have eyes perceive by their sight, must be rendered sensible to them by the touch. Consequently, the object of all such attempts has been to make them acquainted with the letters that we use ourselves, or to compose for their use arbitrary figures, to which a conventional value may be assigned; for it was only at a much later period that the teaching them our alphabet was thought of.

The first signs were nothing but the Illyrian or Sclavonian alphabet modified, which begins like most of the ancient alphabets, by *a*, *b*, *g*, *d*, *è*, *z*, &c. of which the invention is attributed to St. Jerome, because he made use of it for the translation of the *Vulgate*. This alphabet had, undoubtedly, been preferred to all the others, on account of the square form of the letters, which, it was thought, would make them better to be known by the touch than ours. I

am sorry I cannot give here the figure of these singular characters, which were soon abandoned, as they did not offer more advantages than common characters.*

Afterwards moveable letters were made on small thin tablets of wood, about eighteen lines high by six broad. They were placed on a board with grooves, and were made to slide on it, by the side of each other, in the same way as has been since done for the small figures of reading by echo. This process, very defective for teaching the blind, is well enough for enabling them to teach persons to read who have their sight.

It was with similar letters that Usher, archbishop of Armagh, who died at Camberwell, towards the end of the seventeenth century, was taught by his two aunts, who were blind.†

As early as the sixteenth century, letters in wood had been cut to instruct the blind; but instead of making them project, they were made hollow: the fingers could not feel the circumference of the letters as with those in relief; they plunged into the hollow, and the blind perceived, though more difficultly, the form of the

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* The figure of these letters may be seen in the excellent *Typographical Manual* of Fournier, vol. ii. p. 226, No. 68, edit. 1766.

† Biogr. Brit. London, 1773.

letters. When an impression was made with these plates, the letters remained white, and all the rest appeared black.*

Rampazzetto had published in 1575, examples of letters carved in wood, which he dedicated to St. Charles Borromeo; but these plates, which were not preferable to those of Francis Lucas, offered the same inconvenience, that of the cohesion of the letters, and consequently the necessity of engraving as many plates as pages, as is done at present with stereotype impressions.†

In 1640, a notary at Paris, called Peter Moreau, had moveable leaden characters cast, for the use of the blind; but disgusted by the difficulties he met with, or not caring to advance the money necessary for this undertaking, he gave it up, and merely undertook to make punches and matrixes of new characters, in the style of writing; a discovery which has procured him a name in typography.

Other persons had attempted to give the blind an idea of letters, by figuring them on large pincushions, with inverted needles. The blind derived a double advantage from this method, as he learned the form of the letters and exercised his fingers in running over the extremity of

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* Arte de Escrivir, de Francesco Lucas, dedicated to Philip II. King of Spain, Madrid, 4to. 1580.

† Essemplare di piu sorti di Lettere di M. Gio Francesco Cresci, Milanese, scrittore in Venezia, 4to. 1575.

these points; it was by this ingenious process that Miss Paradis had learned to read.

Moveable letters of wood have also been made, like those which printers use for bills to be posted up; but all these insulated letters had the inconvenience of not being able to be collated in great numbers, and could only serve, at most, to make the blind acquainted with the alphabet.

As people cry very loud to make the deaf hear, they think it is necessary to present to the blind objects of very great dimension, that they may be more easily felt; which has given rise to the great letters I have already mentioned. We do not sufficiently consider that the blind, who can only have successive ideas of the objects which he touches, must necessarily, at first, form different opinions of things, which, though identical in their form, differ in size. He must perform a secondary operation, in order to bring together his first ideas, and finally to judge by comparison, after having run through the whole series of intermediary ideas. Do not we do the same thing when we see a drawing in miniature? We do not recognise it always immediately, and we should not even recognise it at all, if the reduction were carried too far: *because the cessation of a colour is to the eye, what the cessation of resistance is to the touch.**

The blind du Puiseaux made use of wooden

* *Of Signs, and of the Art of Thinking*, vol. iii.

letters with a tail, which he connected together by means of a metal skewer, which traversed each tail, as blacksmiths join the iron letters that are used for stamping barrels.

This form of letters and the method of uniting them, was already a great improvement; but as a substitute for writing, it still remained to discover the possibility of making these letters so far independent of each other, that they could be taken off separately, and replaced, when required, by others.

The first characters were cast by a pewterer, but were very imperfect, as he had neither punches nor matrixes, and cast them in sand. In 1783, the Philanthropic Society had punches engraved and matrixes struck, with which characters were cast by Fournier. M. Rouillé de l'Etang, then treasurer of that society, paid the expence of them.

Without falling entirely into the error of those who formerly attempted to make the blind acquainted with our characters, the letter-founders, who forty years ago cast the first letters in lead, made them much larger than was necessary, (about six lines high,) always supposing that they would be more easily recognised than those of two lines, for example which we now use. Experience has since proved, that it is not the size, but the perfection of the form of the letters, which helps the blind to distinguish them, for they recognise completely the smallest printing

type (the *nonpareille*.) When their fingers are insufficient they touch the objects they wish to ascertain with the point of their tongue, and are then never mistaken.

These first characters being found to be of too large dimensions, new punches were cut, and an assortment of characters was cast in the foundry of Vaflard, nearly similar to those which we make use of at this day.

To give an idea of these characters, which are read from left to right, like common writing, while printing characters are read, on the form, from right to left, we have had the twenty-five letters which compose the alphabet of the blind engraved on wood, placing them in a direction suitable for printing.

In adopting this form of letters, which is very remote from the ordinary form, no regard has been paid either to custom or regularity; the only object has been to make them easily known by the touch, thinking that whatever difference there may be between these letters and common letters, this alphabet was, nevertheless, much more suitable than any that had been made down to our time, and the letters of which were foreign, or connected with nothing like those I have spoken of above.

We have made considerable changes in the new punches, which the administration has lately had engraved by Lyons, an engraver and caster of characters, and for that purpose we have con-

sulted the oldest blind pupils, and combined their observations with ours, in order to render this reform as useful as possible.

The *c* is now more rounded than in the preceding casts, so that the blind no longer confound it with the *c* and the *o*. The two sides of the *u* are a little more separated, which prevents this letter being confounded with the *a*. The upper part of the *k* has been lengthened, and the external angle is more open. By means of this correction, it will no longer resemble the *h*, &c. In general, the letters are more opened, and their dimensions in breadth has been a little augmented, which has prevented the former mistakes, and at the same time has given them more elegance and solidity.

The metal of the first cast was too soft, and accordingly the characters that were produced were afterwards rounded off. In the materials of the last cast there was a much greater quantity of regulus of antimony than in the first. The common proportion is from fifteen to eighteen pounds of antimony to a quintal of lead for printing types. This proportion varies according to the size of the type; it increases for very fine ones, and diminishes for those that are less so. Ours, which are subject to strong pressure, should be composed of one part of antimony to three of lead, the better to resist the frictions.

Our characters differ from those of printing

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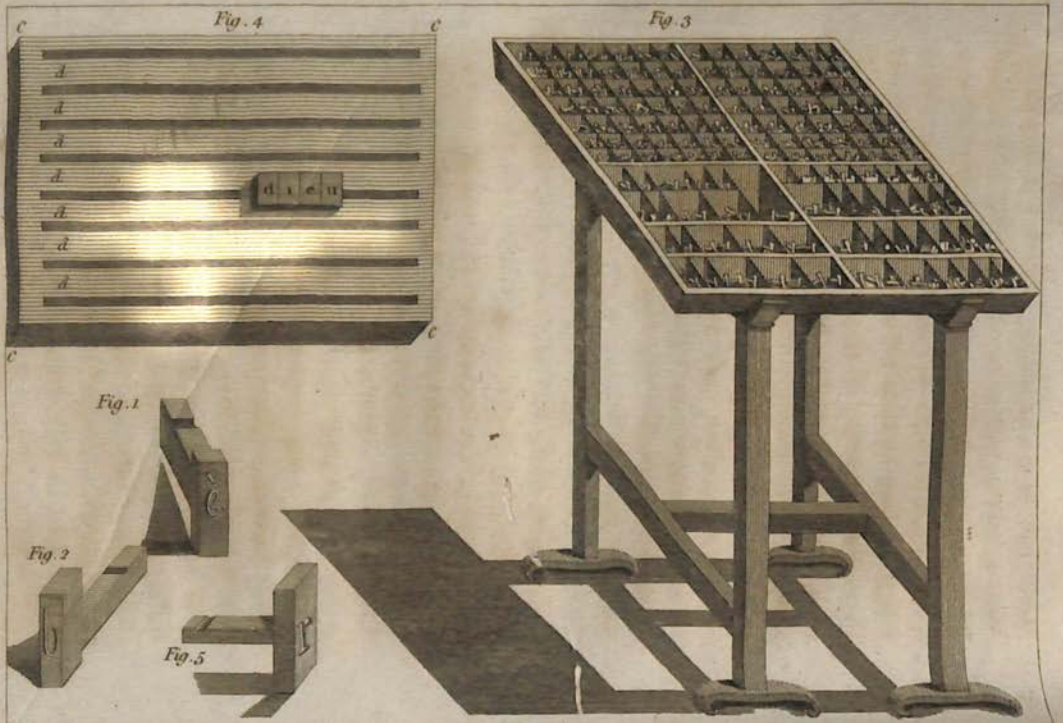

types, not only because the letters are turned in another direction, and are not proper for printing black; but also because the tail (*see fig.* 1.) is much larger than it commonly is to support a letter of that size, (*French canon,*) and because the letter rests on a transversal part (*fig.* 2.) equalling in extent two-thirds of the length of the tail. The object of the transversal part is to stop the letters that are placed on the composition board, which I shall describe hereafter.

In the beginning, the letters, similar in the inferior part to common letters, had no transversal chevron, and not being supported on the board, they only rested on the bottom: this hindered the boards from being transported from one place to another, as may be done at present. The chevron has another advantage, that it offers a support to the extremity of the fingers, and affords, by the contrast of a plain with an elevated surface, the means of ascertaining the relief.

The letters are placed in two cases, (*see fig.* 3,) divided into divers small squares, perfectly like a printer's. Every square, which is called a *box*, contains one sort of letter. The *boxes* are larger or smaller, according as the letters in them are more or less frequently used. The lower case (*see fig. a.*) contains the small letters; the upper, (*see fig. b.*) contains the capital letters, algebraical signs, accented letters, figures, &c.

These cases are commonly placed on frames, (*see fig.* 3,) and bent from before backwards, forming an angle of about forty-five degrees, in order that the compositor may easily reach the capitals in the upper case, without being obliged to make any great motion, and also that the letters may not slip from one box into another.

When the letters are taken from the boxes, they are immediately arranged on the composition-board, (*fig.* 4;) while in printing, the compositor arranges his letters in a composing-stick, which is lengthened or shortened according to the extent which the line ought to have, and is called *justifying*.

On the stem of our characters, as well as on those of the printer, there is a nick, (*see fig.* 5.) which serves to point out the upper part of the letter: the blind person, on taking the letter out of the box, instead of touching it to ascertain the position of the nick, drags the stem along the lower part of the box; if it does not catch, he knows that the nick is above, and that the letter is in the position in which he must place it on the board; if, on the contrary, he turns the letter between his fingers in carrying it to the board.

The blind never mistake in taking the letters from the case, but when some have fallen from one box into another. The fault which results from this, and which those who have sight commit also, consists in the substitution of one letter

for another, which every body may remark even in the most accurate editions.

When exercised in this mode of composition, the blind acquire quickness enough to transcribe on the board in a quarter of an hour ten or twelve lines of a common 8vo. This process, which was used originally for teaching them to read, is now employed also for teaching them languages, and every part of their education.

The composition board we now use (*see fig.* 4.) is far preferable to all the means hitherto contrived. This board may be larger or smaller, but should not be less than an inch thick, and of oak or walnut-tree. It is composed of a frame or case (*c c c c*) about eighteen lines broad, and of rulers (*d d d d*) separated from each other by an interval equal to the thickness of the tail of the characters, that they may enter easily, and be placed there like the word *Dieu*, which serves as an example. The number and breadth of these horizontal rulers is proportioned to the dimensions of the board, which must be provided at the angles and underneath with square pieces of iron screwed in, which prevent the dislocation and separation of the frame which supports all the weight of the characters.

As to the replacing of the characters in the case, it is the same as for the common characters: the blind man takes between the thumb and first finger of his right-hand, one or more words at a time, and putting his hand over each

box, lets the letter fall in which he had taken for composing; this is called *distributing*.

Children who are sent to the Institution are exercised in recognising the letters; but they do not begin the alphabet as with those who have sight, by *a, b, c,* &c., which would be creating unnecessary difficulties. They are first taught to touch the *full stop,* then the *comma,* by making them sensible of the difference between that stop and the stop with the *tail* below, which makes a *comma,* then the *semicolon,* the *colon,* the *mark of exclamation,* the *interrogation,* and the *parenthesis.* Care is always taken to compare one sign with another, and to make them touch from time to time, a *quadrate,** in order to make the form of the signs more perceptible. They next proceed to the study of the letters; beginning with the *O* of the capitals, and immediately after they perceive the *o* of the lower-case, with all the series of letters which we call *simple, l, b, i, j, d,* &c. and comparing, whenever that is necessary, one letter with another, in order to exercise their touch. Care must be taken that they do not read with their nails, that they

* A stem, or tail, of metal is so called, above which there is no letter, and which, consequently, remaining below the level of the other letters, leave neither mark nor colour on the paper. There are quadrats and spaces of different sizes. The *quadrats* serve to fill up the line of a paragraph; the *spaces,* to make a proper division between the words.

do not press the letters too much, so as to harden the skin of their fingers, the ends of which should be soft and sensitive, in order to feel the form of the relief, when they are put into the hollows.

The letters being known singly, they are taught to distinguish the vowels and consonants, and then to form syllables, words, and at last phrases. The tasks are then done with these characters as those who have sight do with writing.

CHAPTER II.

Of Printing for the Use of the Blind.

When the means had been discovered of teaching the blind to read, by the composition of a particular character, it was thought possible to print books for their use with the same; but till this first essay of a new kind of printing appeared, nobody would believe it was practicable.

The inventor took the idea of printing in relief from seeing a sheet of paper just from the press, on the back of which the letters appeared in relief, from having been forcibly struck, but in a contrary order.

Our printing letters are similar to those we have described in the preceding chapter, with this difference, that instead of being raised on a transversal chevron, they rest on a stem of an equal breadth in all its parts, like printing letters, from which they differ only by having much more white, and from its not being necessary to interpose spaces to separate them.

The letters are placed on the form from left to right, and the imposition of the pages is, consequently, the inverse of the usual imposition. In black printing the lines are read from right to

left, because the paper being taken from above the form, becomes reversed after having received the impression, and can be read from left to right.

At first, for printing in relief, a wooden press was used, like those for expressing oil, pressing cloth, &c.; but when the board was rather large, the tablet which was to make the pressure on the paper was not uniformly closed by the screw, and the edges were less pressed than the middle; so that the insufficiency of this process was very soon perceived. As nobody imagined at that time that a common press would serve for printing books for the blind, another method was contrived. This gave birth to the cylindrical press, made in 1784, by Beaucher, a lock-smith. This press, which was very like that used by copper-plate printers, had, moreover, two iron bands, between which the forms were placed. A lever made the cylinder move, which rolling on the board caused a successive pressure, and produced a bad effect, because the paper was displaced by the rotation of the cylinder.

M. de Kempellen, inventor of the automaton chess-player, made a press for Miss Paradis, with which she printed German characters in relief; but of this press, and of the manner of using it, we have never been informed.

Fruitless efforts continued to be made for printing in relief, when M. Clousier, the king's

printer, to whom the establishment has very great obligations, conceived that a perpendicular pressure, given to the whole sheet at once, would be preferable to successive pressures; he used such presses for printing in relief, and succeeded completely.

A press was afterwards constructed with a strong bar and a table in yellow copper, very thick, able to support the strongest pressure.

The mechanism of printing in relief differs, in many things, from common printing: in the relief, the letter, pressed from above downwards, incrusts itself in the paper by repelling it in a contrary direction. To avoid tearing, the strongest and best made paper is employed; and the *grand-raisin* is commonly preferred to every other.* It is steeped for several days,

* For some years past the printers have employed a sort of paper called *machine-paper*, which seems pretty strong to the touch, but has no substance, because, in the manufactories they employ to pound the rags, hammers, put in motion by a mechanism which cannot modify the strokes, and the linen is in a manner pulverised; for this reason, when the paper is torn, one does not perceive those filaments which are perceptible in that made in the old way. This paper, which besides is very bad to paste with, easily tears: which has lately happened to us in printing an English Grammar: when the pressure of the bar was too strong, the characters went through the paper. Double *grand-raisin* well pasted, or *carré* of large dimensions, called *carré des vosges*, which is much cheaper, should be employed.

and must be almost reduced to a paste before it is put on the form, and is carefully covered with several thick pieces of flannel. A man draws the bar of the press towards his breast, while another drives it back violently in the same direction. A great pressure is not made immediately, which, to make use of the expression among the workmen, would *astonish* the paper. They begin by a slight pressure, for which it is sufficient to make the bar go over a quarter of a circle, or thereabouts; when repeated it is increased; and finally, after resting an instant, the bar is brought as far as possible, and they stay on the stroke four or five minutes, in order to give the flannel time to penetrate into all the hollows, and that the paper may dry by the pressure of the characters, and not grow flat after it is drawn from the form, to which it always adheres strongly, though the precaution is taken to smear the letters, from time to time, with dry soap, in order to prevent the glutination.

It is easy to conceive, from this explanation, that it is impossible to print on both sides the paper if we wish to preserve the relief. If the opposite side of the sheet were printed, the first impression would be almost entirely destroyed by the second.

When we wish to have the letters in relief and black at the same time, a tympan is added smeared with ink, (for there is no frisket when the printing is white,) and by letting it fall gently

on the sheet, which is then pressed between the form and the tympan, the letters appear black.

The blind, who print all the books for their use, can print also like those who have their sight. The business of a printer is even one of those for which they show the most talent. As early as the year 1786, MM. Vincent, Clousier, and Saillent certified that they had seen them *compose, justify the lines and pages, impose, touch the forms, make the margin, serve the press, distribute the characters*, &c.* The blind had made great progress from that epoch down to 1812, when their printing was unmercifully destroyed by the order of the director-general of printing and bookselling. In consequence of this act of cruelty, these unfortunate beings lost the means of learning a business, which put them in the way of gaining a livelihood better than any other.

Nevertheless, in order to prove that the business of a printer is very suitable for the blind, we continue to make them print before the company on public days, the prospectus of the exhibition: but, not to be in opposition with the regulations of the press, which forbid any body but printers to have types, we send them to compose the board at a printer's out of the house, and send it back immediately after the exhibition is over.

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* *Report of the Academy*, p. 15.

CHAPTER III.

Of Books for the Use of the Blind.

We should have wished to have been able to speak of books in the second chapter, immediately after having treated of reading: but as many things relative to the composition of these books are connected with the details of printing, we have been forced to invert the natural order of classification which we had adopted.

As soon as the sheets are taken from the press, they are spread singly on lines to dry, taking care that they are not damaged by friction.

The sheets are then joined together by pasting the margins only, the lines of the *verso* are made to meet with those of the *recto*; finally, by stitching the leaves together, they are made into volumes, which are covered with thick pasteboard.

The method of executing this pasting has been altered several times; it was thought, at first, that by interposing between the two leaves a compact matter capable of resisting the pressure of the fingers, the relief would be more durable; and it was with this intention that, in the first books, the agglutination was made with paste thickened with powder of rotten

wood, with which the hollows were filled; but the paste, the humidity of which could not evaporate, did not dry, and softened and swelled out the paper. It has since been found, that the air inclosed between each sheet was sufficient to hinder the relief from falling.

It appears, from what we have hitherto said, that many attempts had been made to teach the blind to read; but that all these painful efforts had ended in teaching them merely to learn the alphabet. About the middle of the last century, a learned foreigner thought he had discovered a method of making books in relief. His process consisted in writing on thick paper with a viscous and corrosive liquid; this writing was sprinkled with very fine scrapings of wool, as is done for making the velvet of tapestries; but the letters thus made were heavy, the finer parts did not come out, and the friction soon destroyed them.

In 1783, MM. Adet and Hassenfratz, attempted, unsuccessfully, to compose for the blind a thick ink, which, on drying, would have preserved the relief. This attempt has been since renewed by M. Robertson; but also without success.

The discovery of printing books in relief is one of the most important for the instruction of the blind. It is by the assistance of these books, which have no other inconvenience but that of being bulky, that they are taught the elements of

languages, and fix in their minds the beautiful passages of history and morality which they have learnt; for they know much better what they have read than what they have heard: and we therefore augment, as far as our means will allow, the library of the blind with works, which we think fitted for their instruction. They have already two Catechisms, the Office for Morning and Evening, French, Latin, Greek, English, and Italian Grammars. One would hardly believe with what rapidity they read in these books, if one did not see it at the public exercises.

Attempts were made to diminish the bulk of the volumes, by making abbreviations, which consisted principally in the suppression of the *m*, *n*, *u*, the double letters, &c.: but as, to indicate the abbreviation, a sign was necessary on the preceding letter, it greatly increased the embarrassment of the reader, and was, therefore, given up.

The following example will show how these abbreviations were made:

When the *o* was to be followed by an *n*, the bar was placed above. To indicate that a double letter was taken away, a stop was placed below that which remained. The *u* after the *o* was replaced by a bar under the latter letter, &c.

By means of books in relief, the blind teach young people who have sight to read, who are afterwards useful to them as readers. They

begin by teaching them the letters by means of the books we have mentioned above. These letters, which are cut in pasteboard, and fastened on the book, are perceptible to the blind man, who can touch them; and to those who have sight, who can see them. When the twenty-six letters of the alphabet are learned, the blind man, having in his hands a table of syllables in relief, similar to a copy in black that is under the eyes of the child, makes him spell, and thus the readers of our blind men have learned to read and look with rapidity in the Dictionary.

CHAPTER IV.

Of Writing

As all men prefer those things, the possession of which is difficult, before those which they can easily obtain, so the blind, who can only write by surmounting numberless obstacles, set a great value on it. Among the privations arising from their melancholy situation, they reckon the impossibility of writing as one of the greatest. It was, perhaps, to console them that attempts were made so long ago to teach them to form characters, and to enable them to hold a correspondence without the necessity of recurring to the intervention of a third person.

To discover the means of making a blind man write seems an incredible piece of dexterity; nevertheless, this study now rests on such sure principles, that it is become, we will not say easy, but practicable; which is proved in our public exercises, when the pupils write the phrases that are dictated to them.

Before we describe the process now employed for writing, we shall rapidly run over the series of attempts made down to this time for rendering it easy to the blind.

In the researches we have made on the in-

struction of the blind in general, we have found nothing beyond the end of the seventeenth century which indicates that they had learnt to write. Saunderson himself, who lived at that period, could not write. Bernouille, being at Geneva in 1676, taught Elizabeth Waldkirch to write, who had lost her sight two months after her birth; but he never made known the method he employed.

Dr. Burnet, Bishop of Salisbury, has mentioned many particulars, in his Travels in Switzerland, of a Miss Walkier, of Schaffausen, whose eyes were burnt at the age of one year. She had a prodigious memory, spoke five languages, and had learned by heart all the Psalms of David, and the New Testament. She had learned theology and philosophy; played very well on the violin, and was a good musician. To all these valuable qualities she added great piety and resignation in supporting her misfortune. This young woman had learned to write by means of characters cut out hollow in wood, which at first she felt with an iron point; she next made use of a pencil, and when Burnet was at Schaffausen, in 1685, he saw her write very quickly and correctly.*

Towards the end of the last century, when the minds of men, directed towards beneficence,

* Travels in Switzerland and Italy, by Dr. Burnet, Bishop of Salisbury, vol. i. p. 218, Letter 2, Rotterdam, 1718.

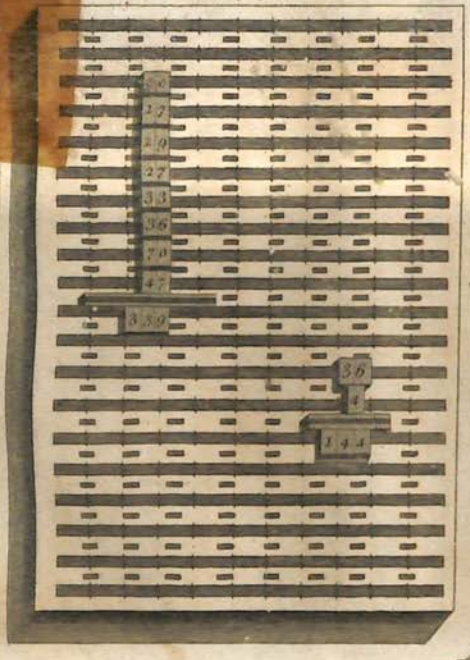
were seeking improvements in every thing, the ink, which we have mentioned in the preceding chapter, for the composition of books, was thought of for the writing of the blind. This ink, which was expected to congeal immediately on the paper, congealed much quicker in the pen; and this method appeared so defective that it was given up almost as soon as it was tried.

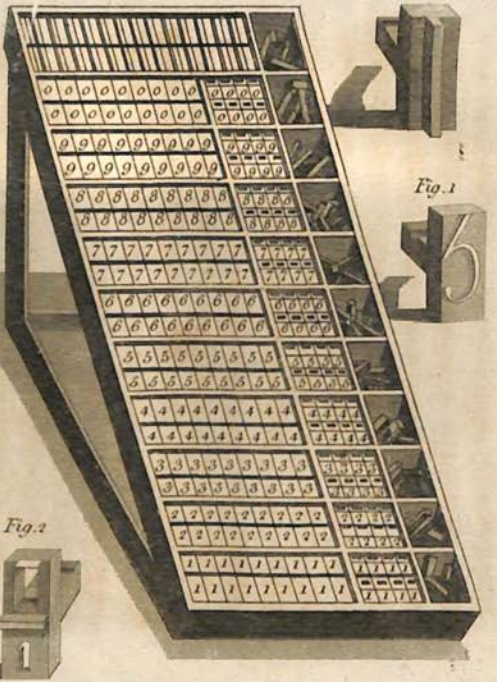
Discouraged by the difficulty which they found in making the blind write, the first persons who taught them thought proper to give up the use of the pencil, and merely adopted an alphabet in copper, the moveable letters of which were touched with balls supplied with an ink made with gum. These characters applied on the paper, left on it the impression of the letters; but the blind man, who could not follow with the forefinger of the left-hand the letters which he traced with his right-hand, often printed these letters one upon the other, without perceiving it; and at other times he placed them at great distances: sometimes, also, not having taken ink enough, the letters were not visible. This process, though insufficient, might have been susceptible, perhaps, of some improvements; but when other methods more easy and more certain were found, it was set aside.

In the beginning of the institution, they made use of a wooden board, (see fig. 1,) which was given up afterwards for another, that has been modified since. This first board is ten inches

broad and sixteen high; the edges are about three lines higher than the centre. These edges are furrowed with twenty-four gooves, three lines in depth, which makes the bottom level with the central part. At the external part of each of these grooves, is a hole which traverses the board throughout; in the internal and lower part is a long groove three lines in extent from within outwards, and about a line high. It is in this groove, which extends from one extremity of the board to the other, that the paper to be used for writing is introduced by making it slip in. A small rod of iron-wire is then placed transversely in the parallel holes, the two extremities of it being bent square like those of curtain-rods, and the blind write by following the rod, on which they draw their middle-finger. This board, besides many other inconveniencies, which it is useless to enumerate, as it is no longer used, was very bad for arranging the rod, which the blind often placed diagonally on their paper, especially when the board was very broad, or the lateral grooves were worn.

The second board, which M. Haüy contrived, is of a different form from the preceding, (*see fig.* 2;) it is nearly of the same size, and consists of a board as thick again, of which the bottom is fixed. Above is a parallelogram opening, in which is a frame opening with hinges on the lateral left-side, and kept shut on the right side by two small copper-bolts. This frame is





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furnished with several moveable rods of iron. Below the two great ascending pannels of this frame, there is on each side a broad steel-spring, stretching from one extremity to the other, fixed at one end by two English screws, and at the other, only stopped, at pleasure, by a turning bolt, like those which shut the frame. It is between these springs and the lower part of the sides of the frame that the paper is placed, which remains immoveable under the rods: such was the second board. That which has been made since differs from it in this, that instead of a wooden bottom, there is an opening equal to that of the frame, which, provided with a thick silk, gives the blind man the facility of reading what he has written, either with the stilet of the pencil, because the pressure is always strong enough to leave the trace of the letters on the silk. This improvement, and some minor meliorations, which it would be difficult to describe, have determined us to adopt this board, which was composed by Mr. Heilman, a blind man, who has also contrived a portative portfolio for the blind, by means of which they may write, and read directly what they have written, with the greatest ease.*

* We should always prefer, for the instruction of the blind, the means contrived by them: they perceive much better than us, as we have already said several times, what is wanting in our ordinary processes to render them useful to them.

Method to be followed in teaching Writing to the Blind.

The principles of writing for the blind are, with some small difference, the same as those for people who have their sight. The latter are exercised at first in making strokes; and we also begin by giving the blind an idea of the elementary letters. They have, in this pursuit, a great advantage over those who have their sight, because, knowing already how to read, they know in part the form and the direction of the letters in writing.

Attitude of the Body.

It is of little importance what attitude the blind take for writing, they have none of the motives which determine us to observe the rules established by writing-masters, as it is not with the pen but with a point that they write. He has neither full nor fine strokes to make; and would write as well on a table or against a wall. Nevertheless, we are in the habit of exercising them either on their knees or on a table, by placing them so that the light may come from the left-side, in order that he who teaches may easily see the blind person's hand, whose left-arm should rest entirely on the board, the hand closed, with only the fore-finger held out, to follow the stilet which traces the letters.

Fig. 1

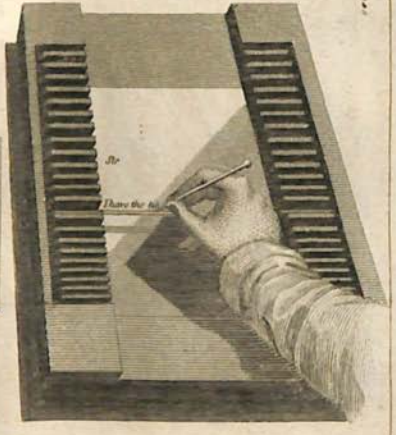

Fig. 2

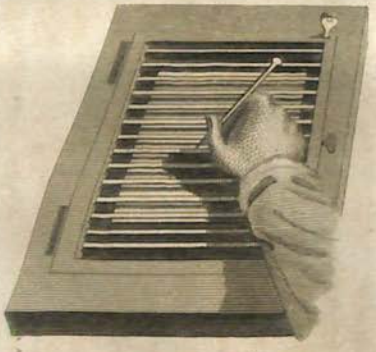

Fig. 3

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Way of holding the Stilet.

The stilet, or pencil, should be held with the thumb, the fore-finger, and the middle-finger; the two others are bent back and drag along the paper in the progression of the hand. The blind, in general, have the fault of holding the stilet too close between their fingers, and of pressing it so hard on the paper, that they tear it. They must, therefore, be habituated early to bear on it as lightly as possible.

Motions of the Fingers and of the Hand.

It is rather difficult to make a blind person understand why the letters should not all have the same direction; why a letter inclined to the right is not as well as one to the left. To avoid, therefore, the irregularity that would necessarily result in the form of the letter, from the ill-directed motions of the wrist, instead of allowing them to make strokes vaguely, in different directions, as is the practice with children in general, we begin with making them follow, with an iron stilet, on a tin or copper plate (*see fig.* 3) the form of the less compound figures, cut out hollow; first simple strokes, then strokes bent up from below, (*ı*) which forms the *i*; two of these strokes near to each other, (*u*) which forms the *u*; then strokes bent back in a contrary direction above and below, (*ɔ*) which makes the second part of the *n*; afterwards the

c and the *i*, which, joined together, form *a*; the *c* and the *j*, which form the *g* by their union. We thus go successively over the whole series of the letters, passing from the most simple to the most compound.

Remark on the Alphabet.

One cannot adopt for the blind a particular sort of writing, such, for example, as the clerk's hand, the running hand, English writing, &c. It was necessary to discard the letters that would have been too difficult to form, and to select from each of these sorts of writing the letters that would suit the blind best. But the details which would be necessary to make this understood would, probably, appear puerile and of little value, and we therefore omit them in this place.

Of the joining Letters in order to form Words.

When the blind person has been long exercised on the copper table we have just described, and has practised all the remarks we have enumerated, we must make him write on the board, No. 2. For this purpose we make use either of an iron stilet, about six inches long, or of a pretty hard pencil. In the first case, the white paper is put on the board of the writing-table; the frame being raised, on this white sheet is placed a sheet of paper blackened with grease and chimney-black on the side which corres-

ponds with the white sheet; this second sheet is fixed against the lower part of the frame, all the motions of which it follows by the elastic spring I have already mentioned. The frame is allowed to fall on the white sheet. The blind man, by writing on the first sheet, takes the black colour out of the second in every part where he has leaned with his stilet. If he wishes to have several copies at once, it is sufficient, for that, to form on his board a sort of mattress, composed of sheets alternately white and black; by writing on the first, he will have written on all the others, an advantage which the pencil has not, which, besides, has the inconvenience of frequently breaking, and of marking no longer when it wants to be mended, which the blind person cannot do himself. For these reasons we have abandoned the pencil, and prefer the stilet and coloured paper, according to the method of Heilman.

The board being arranged, as we have just said, it is placed before the blind person, so that the left inferior angle touches the edge of the table, and the right inferior angle is about an inch from it. The person who gives the lesson must be standing behind the blind man, and taking his hand in his, he places his middle finger on one of the rods, to accustom him to feel it and slip over it. When the pupil is accustomed to guide his stilet in a regular manner between the two rods, he is taught to make let-

ters; and that he may keep the necessary interval between each of them, the extremity of his left fore-finger rests against the point of the stilet, which it accompanies, and of which it measures all the motions. When he can place the letters at a proper distance, and write straight between the two rods, the separation of which is about eight lines, one of them is taken away, which doubles the interval, and he is then exercised anew; afterwards a second is removed; and all being taken away successively, he is made to write in the frame without any rod, and at last on a sheet of paper without either rod or frame.

The writing of the blind is never very regular, because they cannot keep on a line with a uniform base; the tails of the great letters go unequally beyond that line; nor can they appreciate the dimensions of our letters written with a pen, nor form an exact proportion in the form of their letters; but still their writing is legible, and sufficient for their wants. They do not write very fast: but as they are never in a hurry, slowness is to them a trifling inconvenience.

CHAPTER V.

Of Geography.

Down to the epoch when M. Weissembourg, of Manheim, made maps in relief, the lessons of geography given to the blind were merely oral; consequently, they had made very little progress in that study. The first attempts of M. Weissembourg were not happy. He began by having the principal divisions of Europe engraved in relief, on a board of the size of ordinary maps, in the hope of being able to get such maps printed as books are; but the too-large hollow spaces destroyed the effect of the projections, and this defective plan was abandoned almost as soon as formed.

The second attempt consisted in spreading over all the illuminated lines, glass beads of the same colour as the illumination, and in fixing them by means of a thread, which went through them, and which was sewed on the map; but these beads broke, or else did not keep in relation with the subjacent lines.

For the glass beads he afterwards substituted *chenille*, which he pasted before he sewed it.

69868

He also made maps, at a great expence, which excited more curiosity than interest, and were much spoken of at the time: the seas and rivers were represented on them by pieces of glass, cut with great art, and the different countries were distinguished by sand of different granulations; the towns were known by copper nails with round heads of different sizes: but the rubbing soon made the sand disappear, and these maps were considerably damaged by the least handling; they were of no use to those who had their sight, who could not even guess the purpose of them, unless informed of it.

This learned blind man was not long before he perceived the insufficiency of this process, notwithstanding the eulogiums that were lavished upon him; he, therefore, endeavoured to discover more durable and less defective means, and at last fixed on the following scheme:

He had common maps pasted on strong gummed linen, as is done for folding maps that are shut up in portable cases; these were embroidered with little chains, and by employing silks of different sizes, he could make all the divisions that he judged necessary, much better than with the sand, which could only serve to indicate great parts. By making use of coloured silk, he could even make these maps useful to those who had their sight: nevertheless, this means, though much preferable to the other, was still defective, as the embroidering, after

having served some time, got loose, and tearing the paper, lost the connexion which it had with the illuminated lines.

The geographical maps of the blind were in this state when the inventor of those which we make use of at present thought of employing wire for making the divisions, which till then had been made successively with beads, chenille, or different embroideries. The following is the process for making them, which are not less solid than useful.

The map is pasted on a very thick pasteboard, and then on all the parts that are to be made apparent, is pasted iron-wire, well seasoned, easily bent, and folded in silk-paper, like that which the milliners use for ladies' hats: this pasting is easily done by means of a small hair-pencil, like those that are used for colouring with Indian-ink, and the agglutination of the wire on the map is very solid, by means of the paper with which it is surrounded. As to the circumvolutions which this wire requires, they are done very exactly with very fine crane-beaked pincers, taking care to put it often on the illuminated lines, in order to be certain of the exactness of the different parts; this wire is cut in shorter or longer pieces, according as the work requires; nevertheless, too frequent cuttings are avoided, because the ends of them come over and tear the map laid upon them, or if the student hits his fingers against them, he might

hurt them. The towns and islands are indicated by nails with demi-spherical heads of different sizes, which are nailed into the pasteboard, which ought to be thick enough for the points not to go through.

Maps thus made would be sufficient for the wants of the blind; but would be disagreeable to the view, and fatiguing for masters who have their sight, who could not discover the parts covered by the wire, or hid by the paste; and for this reason the first map is covered with a second perfectly similar.. All the wrinkles which the paste or other foreign bodies may have left on the pasteboard, are taken off by scraping it with the back of a knife; it is glued in all its parts, and the second map, which has also been moistened with a slight layer of paste, is then fastened on. The centre is first pressed, and while another person raises the edges, a slight pressure is made with a rag, proceeding from the centre of the circumference. This operation ought to be done as quickly as possible, to avoid the desiccation of the paper, and prevent the formation of bubbles, which happens when the compression has not been made circularly and quick. The centre application of the map being finished, partial pressures are made on the wires, that the paper may go in on each side, and leave the divisions apparent and well-arranged together; this is done easily enough while the paper is wet, as it then yields to the

pressure of the fingers. When the map is complicated, like that of Asia for example, it is necessary that many persons at once should press the iron-wires, that the map may not have time to dry. When this first work is terminated, there still remain wrinkles on the map; but it would be wrong to try to make them disappear, as it would tear if the paper were too much stretched. It is placed, immediately afterwards, under a screw-press. If there be no press broad enough, it may be put on a very even table, covered with a thick flannel, and pressed down with a board and heavy weights, in order that on drying it may preserve exactly the divisions that have been made in it.

After having left it five or six days under the press, it is drawn from it perfectly dry, and is varnished with a very soft pencil, slightly moistened with a white varnish, made with spirit of wine, in order to prevent the humidity of the fingers from fretting the paper.

Maps thus prepared are very serviceable to the blind, and very commodious for their teachers, who can read them with ease. Nevertheless, when the divisions and cuttings are carried too far, they become confused; which has forced us to give up the use of the map by departments, as the limits, too often alike, could not be sufficiently appreciated. We make use of the division by provinces, and we indicate by partial

divisions the number and relative situation of the departments which each province contains.

We have not spoken of the spheres, globes, and planispheres, that we use; it is always by the same process that we turn them to our use; and it would be useless to repeat what we have already said.

CHAPTER VI.

Of the Study of Languages.

In the beginning of our Institution, we confined ourselves to teaching the blind reading, writing, French grammar, and geography: languages were not taught. It was not till long after that they were thought capable of learning them. They began by the study of the Latin language; but what a labyrinth, what a wilderness for children deprived of their sight, was a dictionary, which they could only make use of by the assistance of another person! Notwithstanding, they learnt in this way, with the feeble assistance of masters as inexperienced as themselves, to translate some elementary pieces; but they were soon stopped, and it was then perceived that they could not be instructed like ordinary children; and that the method of teaching must be proportioned to their infirmity. This was, among us, the origin of mutual instruction, which, for the last two years, has been known by the name of the method of Bell or of Lancaster, though it does not belong to one any more than the other, and came to us, according to all appearance, from the Indians.

This method, which is simple and natural, always appeared to us the best, and we had made use of it for a long time, when it was first introduced into public schools.

We are convinced that it would be impossible to instruct the blind collected together, or to teach them any thing, especially languages, without the help of mutual instruction. We have not introduced, either venal recompenses which extinguish generous sentiments, nor those humiliating punishments which repress emulation, nor that desire of pre-eminence which so easily degenerates into pride; and in this respect, our method belongs, perhaps, rather to the system of Pestalozzi than to that of Lancaster.

We prepare our pupils for the study of languages, by confiding to their memory, at an early period, short phrases forming a sense; we have formed for them a sort of *phraseology*, in which all the words, distributed by families, (nearly as in the spheres of Pestalozzi,) class themselves naturally, as well as the combinations, the most usual derivations, the alliances of words with each other, &c. We are far from making an abuse of the memory of our pupils by making them retain lists of words. Languages are not studied in this way; to translate well is not to translate words, but to know their relative value, their different inflexions, and the influence they have on each other. This is what we endeavour to teach them before we speak to them

of rules; for, as Dumarsais has said, there are no general principles, which to be well understood, do not suppose a knowledge of the particular ideas which have occasioned them. To begin by rules which are the result of general principles, is to invert the natural order of things, and begin where we ought to end.

For the translation of languages, we have adopted the use of the interlineary methods; for the Latin we make use of those of Fremont, a distinguished teacher. To a great fidelity in the translation of the text, they add the advantage of being elucidated by very good notes. The Latin word is translated by the corresponding French word, which is found below. In the third line comes what is commonly called good French; on the opposite page, the pure text; below the text the literal translation, and below the translation, the notes and explanations. It is impossible to find any thing more exact and more philosophical than this performance, the efficaciousness of which is proved by the rapid success of our pupils.

Dumarsais, who first translated the Latin authors interlineally, the good Rollin himself,*

* I have always wished there were books made on purpose for beginners, in which they might find the application of the rules ready made, instead of being obliged to do it in themes, which are only calculated to torment them by a painful labour of little use. *(Treatise of Studies)*

Radonvilliers, and all the celebrated grammarians who have appeared since, have expressed a desire to see the use of these translations become general. In fact, can we take too much pains to save children from useless tears and vexations, and above all, from the loss of a precious time, which might be so usefully employed at that age?

We have made the application of this method to the study of Greek; but as there are no authors as yet translated interlineally, my collaborator, Mr. Dufau, by making use of the vulgar characters, as several Greek scholars advised him, has made partial translations on our composition boards. Though long and troublesome, this operation has enabled our pupils to understand Æsop and Anacreon, after a few months' study, which they now easily translate at the public exercises.

The same process is used for the study of English and Italian, as we can derive no assistance from the translation of Boisjermain, which are very incorrect. Our method sometimes fails, I confess, with the pronunciation of English, but these disappointments excite our emulation, and we seldom leave our pupils without being understood. We must do justice to their aptitude and penetration, which are such that some of them comprehend so exactly the manner of an author after the first pages, that they will explain him afterwards, from one end to the other, almost

without any assistance. The girls have not so much readiness as the boys in learning languages: nevertheless most of them speak Italian with ease.

Two masters and one mistress are sufficient to teach eighty scholars, who learn reading, writing, and the French, Latin, Greek, English, and Italian languages; geography, history, the transcendental mathematics, and vocal and instrumental music in all its parts. So great a number of scholars taught, we have the confidence to say, with some pre-eminence, by three persons, is sufficient to show the excellence of the plan of mutual instruction. We may add, that this plan is here directed philosophically; we have rejected the idle and noisy walks, and all the trash of the automatical exercises of the Lancastrian schools, and have adopted only the spirit of the plan, perfected by observation and experience. We hold the first threads, and six professors taken among the most distinguished scholars are appointed to transmit to their companions the knowledge they derive directly from us; the most advanced amongst those taught by the masters are selected for repeaters, and finally, from those who receive instruction from the repeaters, weekly teachers are selected, who not being sufficiently advanced to govern long, only remain on duty a week. Thus, from him who reads Tacitus to him who begins to lisp the first series of the phraseology, all are professors

and masters, and all advance, like giants, towards the object they have constantly before them. This, whatever name may be given to it, is in my opinion, the real method of mutual instruction.

CHAPTER VII.

Of Mathematics.

If the privation of sight may, in some circumstances, prove an advantage, it is in the study of mathematics. The blind have a natural disposition for this science, and apply to it with a decided taste. When very young, they easily learn the most complicated operations of arithmetic, and without employing any of the means which those who have their sight make use of for geometry, they have an exact and precise idea of figures; which is proved by their success in algebra, trigonometry, and the other subsequent branches of mathematics. Their intelligence for this study is so comprehensive, that they are not only enabled to follow completely the demonstrations made on the board, and to profit by the public lectures given by the most distinguished masters, but even to carry off the first prizes in the colleges.

It follows from the principles hitherto established, that we must never use any arbitrary method for the instruction of the blind: it was this principle which determined the inventor of our present arithmetical board, to give up that of Saunderson, which, though very ingenious, ne-

cessarily gives conventional values to the pegs, according to their size and situation.

The letters and cyphers which we make use of at present, are in no respect different from the common ones, and it is in this that the perfection of our method of instruction consists, that it is the same for the blind as for those who have their sight.

These cyphers are mounted like the letters on a transversal chevron (*See plate fig.* 1.): the fractions are mounted in the same manner, but the upper part of the chevron is hollowed in a square form (*fig.* 2.), to receive a moveable cypher in the form of a wedge, by means of which the numerator and the denominator and ergo the necessary changes. Strings, that may be placed horizontally or vertically (*fig.* 3.) serve to indicate the divisions of the numbers. These cyphers are placed in a case (*fig.* 4.), distributed into eleven broad cassetins, by the side of which others are found for the numerators and denominators. This case, more long than broad, should be placed on an inclined plane, like the case for composition.

In the cast that has been lately made, the size of the old cyphers has been diminished one half; they were too heavy, and occupied too much space on the board. The fractional cyphers, which it was thought might be retrenched, were not re-cast.

The calculating board (*fig.* 5.) differs from the

composition-board only by the transversal intervals being crossed by iron wires, which keep the cyphers in relation with each other. The same board becomes geometrical, when pegs are placed in the holes which are on the rods, and are surrounded by a silken thread, as Saunderson did.

It would be a mistake, to suppose that we derive any great assistance in teaching geometry from the little wooden figures which are sometimes used for those who have their sight. I have already had occasion to explain why we did not adopt these means, which would be more prejudicial than advantageous, as they would materialise the thoughts of the blind, who ought to have the idea of these figures mentally. They may indeed assist themselves with some means of comparison: two points separated from each other, a stretched string, a rolling ball, may give them the idea of a strait line; a slack rope may represent a curve, &c. but we must not found on these vague notions, a theory which would have nothing real.

People are astonished to see our pupils go through a course of optics as well as those who see, and they admire their sagacity in speaking of dioptrics and catoptrics. As we do not wish to enjoy an admiration that is unmerited, we must declare, that what makes the demonstration of all the phenomena of optics easy to them is, that they reduce every thing to lines. They perceive only palpable points where we see coloured prints;

for they have not, nor can they have, any idea of colours.* If they distinguish some, it is not the colour, properly speaking, but the colouring matter; and the best proof of this assertion is, that when they cannot guess the colour by the touch, they *taste* it. If in touching they confound blue with black, they are no longer mistaken when they taste it; indigo and nutgalls do not appear the same to them, as our eyes, so apt to deceive us, often make us believe. The distinction of colours, analogous, not by their shade,

* One of our pupils translating at a public exercise, the first strophe of the second ode of the first book of Horace, was stopped at these words *et rubente dexterâ*, &c. by the examiner; who asked him the proper translation of the words *rubente dexterâ*; the young man translated it: *his flaming right hand.* Being pressed again to translate literally the epithet *rubente*, he gave the equivalent, *red.* Being asked again what he understood by a *red arm*: he answered, that he did not think, like Locke's blind man, that the colour red was like the sound of a trumpet; but nevertheless he could form no direct idea of it; but that he had at first translated *rubente flaming*, because he had been told that fire is red: whence he had concluded that heat is always accompanied by redness; which determined him to mark the anger of Jupiter by the epithet *flaming*, because when one is irritated one is hot, and when one is hot, one *must be* red. This answer was made in 1814 by the scholar Fonsequ, who is still at the institution. We thought it extraordinary enough to deserve being quoted, because it gives an idea of the secondary means which the blind employ to attain some vague notions of the theory of colours, which to them will always be a mystery.

but by the dye; yellow and green, for example, appear difficult to them, while deep pink and light red, which appear to us almost identical, are to them much more striking colours than yellow and green. Respectable writers have declared they knew blind men who could tell, by the touch, the colour of the hair of certain animals.* We are far from denying this assertion; but we do not understand how it can happen.

* De comite Mansfeldico cœco refert Keckermannus, *Syst. Physic.* lib. 3, cap. 16. solo tactu album a nigro discernere; de equo fusio vel albo, item de columbâ nigrâ ve cœruleâ judicium ferre potuisse.

CHAPTER VIII.

Of Music.

It is generally supposed, that the blind are not taught music by principles, and that they only imitate the sounds they hear; but this is a great mistake. Nothing could be more wrong than such a mode of instruction. Our processes for teaching music are no other than those that are employed for those who have sight; it is by the methods of the conservatory that our scholars learn the elements of music, of composition, &c. How could they know the measure? how could they execute great pieces with the precision they do, if they were only guided by a blind routine? the signs of music would have no value to them if their form was not rendered sensible; and this has determined us to have engraved on broad boards of pear-tree wood, the figures of the notes, the keys, the rests, and all the alternate signs, with some lessons that serve as examples.

Music was formerly printed in relief; but we have ceased to make use of it, as it was very expensive and of no use: the scholar could not read (with his fingers) and perform at the same

time. The following is the way in which the lessons are now given: a boy, whom the blind themselves have taught to read music, being placed in the middle of the orchestra, solfas some measures of a division, which is before his eyes, announcing beforehand for what instrument the piece is which he sings. The memory of the blind is so faithful, that it is seldom necessary to repeat the same phrase to them more than twice. After having thus learnt successively on all the instruments an equal number of measures, the (blind) music-master puts together what has just been learnt: the boy resumes his solfa, and at length, when from 150 to 200 measures have been retained, in a sitting of about two hours and a half, the chief of the orchestra makes them be repeated several times, in order to give the necessary shades and expression. This piece is connected with the one that was learnt the preceding day, by executing them together. Thus long pieces are learnt, and masses, choruses, symphonies, &c. are so exactly retained, that sometimes a single repetition is sufficient to bring them forward again, though frequently neglected for several years.*

* We have always considered this manner of learning music preferable to many arbitrary systems that have been communicated to us. We recollect having seen at Bordeaux, 18 years ago, a blind man, who played tolerably well on the violin, but having been taught by masters who

They have no masters but themselves for instrumental music; notwithstanding some of them are capable of playing a concerto very well. Each blind professor has in his head the entire method of the instrument he teaches, and a great number of pieces, duettos, &c.*

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knew nothing of the way of teaching the blind, and was ignorant even of the first elements. He had invented a singular method of copying music; he represented the measures by button moulds, the value of the notes by pieces of cork more or less thick, a round one by a ring, a black one by a piece of money, the silences by indented straps of leather, &c. We cannot recollect the confused series of all these signs, which he distinguished, however, tolerably well; but we could not help laughing, when having mentioned the second concerto of Jarnowier, which he was then playing, he went and took out of a cupboard, a sort of string of beads, 7 or 8 fathom long, formed of the articles we have mentioned, which he told us was his concert, and pointed out the most difficult passages in it. He had several cupboards filled with this strange music.

We have seen other blind persons who wrote music on boards, in which were ranges of ten or fifteen lines, like those which Rousseau proposed, with points of different sizes.

Is it not more natural to use methods known by every one, especially when they are easier and more certain?

* It gives us pleasure to find an opportunity of expressing our gratitude to the Abbé Rose, who, for several years past, has composed, for the blind, a great number of pieces of music that have always been heard with the greatest pleasure. We have also many obligations to M. M. Dusort, Habeneck, Jadin Dacosta, and Badouin, for the advice they have had the kindness to give to our scholars, with equal zeal and disinterestedness.

LIBRARY OF THE BOMBAY BRANCH OF THE ROYAL ASIATIC

Plate VI. Pipo.

PLAYING THE PIANO.

LIBRARY OF THE BOMBAY BRANCH OF THE ROYAL ASIATIC SOCIETY

Plate VII. P.122.

PLAYING THE HARP.

Neele & Son, 352 Strand.

No scholar is exempted from the study of music. The choice of an instrument depends on the use he is to make of it after he leaves the institution. The administration has redoubled its efforts, since the removal of the establishment, to realize the project, long since formed, of giving useful professions to the blind; it has done all in its power to prevent them from going, as formerly, when they left our house, to play in public places, which were not always respectable: it was with this view that an organ was purchased, in order to enable those who inhabit great towns to gain a livelihood with this instrument. Those who are to reside in villages where there is no organ, learn to play on the serpent, for they play on all known instruments. They took lessons, this year, for the first time, on the harp. It was not thought possible, till now, to teach them this instrument, so difficult even for those who have their sight, from the painful position of the body, and the multiplicity of strings undistinguished from each other. This fortunate innovation, which has been completely successful, is owing to the zeal of the mistress of the girls,

CHAPTER IX.

Of the means of communication between the Blind and the Deaf and Dumb.

One is astonished at the facility with which the blind communicate with the deaf and dumb, and one can hardly conceive how this communication can take place between creatures deprived of the organs the most indispensable for the intellectual functions.

The reader will learn with pleasure what was the origin of the relations that exist between these two degraded classes in nature, and by what means the blind and the deaf and dumb came to understand each other, long before it was thought of inventing a method for them. These details, fastidious, perhaps, to those who are strangers to benevolence, will not be uninteresting to those feeling and generous persons who delight in relieving misfortune.

During the time that the institutions of the blind and of the deaf ad dumb were united in the convent, formerly of the Celestines, the pupils of the two establishments, brought together by their habitation, but separated by their infirmity, endeavoured to establish points of contact between each other. The heads of the two houses, far from disapproving of this connexion, favoured

it, being convinced that it could not but be advantageous to creatures, whom a sort of confraternity of misfortune led to seek each other.

Both had already received some instruction; for I cannot imagine what mode of communication could be established between the blind and the deaf and dumb, who had learnt nothing. Their situation, I suppose, would be like that of a child without experience, that must be shown every thing. I am therefore going to speak, not of the blind in a state of nature, but of the blind who have been taught.

When the blind had learnt that the deaf and dumb spoke to each other in the dark, by writing on their back, they conceived that this method might succeed also with them, as in fact it did. This new language soon became common to the two families; the deaf and dumb who found it tiresome to have written on their back what they could see perfectly well, attempted to make the blind write in the air, as they do themselves: this means, which was as long as the former, appeared to them more uncertain, as the blind wrote ill in that way; they therefore preferred the characters the latter made use of; but as these characters cannot be easily transported, the dumb taught the blind their manual alphabet, and the one by sight, and the other by touch, easily found by the inspection of their fingers, the letters that are formed by their different combinations. Nevertheless, this manual alphabet, only exhibiting

words, slackened conversation amazingly. They felt the want of a more rapid communication, and the blind learnt the theory of the signs of the deaf and dumb: each sign thus representing a thought, the communication was complete. This study was long and tedious, because it supposes a pretty complete knowledge of grammar; but the wish to talk got the better of all these difficulties, and in a few months, the signs being perfectly well known, took place of all the other means till then employed. The exchange between them was performed in the following manner:

When the blind had to speak to the deaf and dumb, he made the representative signs of his ideas, and these signs more or less exactly made, transmitted to the deaf and dumb the idea of the blind.* When the deaf and dumb, in his turn, wished to make himself understood, he did it in two ways: he stood with his arms stretched out and motionless, before the blind person, who took hold of him a little above the wrists, and without squeezing them, followed all the motions they made; or if it happened that the signs were not understood, the blind man put himself

* It is unnecessarry to observe that the difficulty of these communications is increased by the want of the signs of the physiognomy, and of a part of the gestures and motions of the body, which the blind man cannot appreciate, and of which he has not even an idea; for, in speaking, the blind remain without motion and expression.

in the place of the deaf and dumb, who then took hold of his arms in the same manner, and moving them about, as he would have done his own, before a person who could see, he filled up the deficiencies of the first operation, and thus completed the series of ideas which he wished to communicate to his companion.

But the degree of instruction of the scholars not being the same, they could not make use of the signs equally well; and supplied them by all the means which their inventive imagination could suggest. It was an extraordinary sight to behold a pantomime acted in the most profound silence by 150 children, anxious to understand each other, and not always succeeding; tired out with long and useless attempts, and often ending, like the builders of Babel, by separating without being able to understand each other; but at the same time not without having given reciprocal proofs of bad humour, by striking as the deaf do, or screaming like the blind.

SECOND SECTION.

CHAPTER X.

Of the Manual Labour common to both Sexes.

THOUGH we have neglected nothing in order to carry the education of the blind to the highest degree of perfection possible, as any one may be convinced by the enumeration of the divers branches of study to which they now apply, we should have considered the work as very imperfect, if we did not give these unfortunate beings the means of a certain livelihood, by teaching them some mechanical profession; we should feel the greatest affliction if, after having instructed them in the sciences, they should lose all the benefit of their stay in the Institution, and be obliged to have recourse to public charity, or to solicit their admission into one of those asylums where misfortune and misconduct are but too often confounded.

We have profited by the experience of our predecessors, and our own observations, in the choice of the trades which are fit for the blind. There is a great number which they might fol-

low, but which would not be profitable to them. We have, therefore, thought fit, for this reason, to prefer those only which they can easily practise. We always take care to proportion the business with the physical constitution of the individual, with his intelligence, situation, and that of his family; for it would be absurd to send a blind person into a village with a trade that can only be followed in a great town, and *vice versâ*.

We should have dispensed with the detailed description of the trades followed by the blind, had we not remarked in each of them certain peculiarities, which we conceive it may be useful to point out to those, who at a distance from the capital may wish, with the help of this book, to instruct the blind, without removing them. Most of the descriptions are accompanied with explanatory figures, which are not intended as ornaments, but because we are persuaded that when things have not been seen, graphical descriptions are the surest way of making them well known.

CHAPTER XI.

Of Knitting.

We shall not here repeat what we have said elsewhere of the facility which the blind have in teaching each other, and of their superiority in this respect over those who can see; but shall only remark, that besides the consolation they feel in being together, their emulation is much greater than that of other children. We have seen blind persons taught singly, who could never succeed in any manual labour. We receive every day children twelve or fourteen years old, who at home could not learn to make a single stitch, while the youngest with us are able to make garters in a few days.

It is impossible to conceive how tiresome and tedious it is to teach the blind in general in the beginning; this difficulty is doubled again when they are to learn mechanical arts. Knitting, which is very simple in appearance, and which those who have sight learn easily, presents, nevertheless, great difficulties to the blind. It is, however, the best kind of work for exercising the suppleness of their fingers. They are taught to make garters to exercise them in holding the needles, which they always push too far for fear

of dropping their stitches. The blind person who gives the lesson must place himself behind the scholar, and hold his hands, in order to direct the motion of his fingers.

The reason of all the motions are to be explained to him, and his hands are held till he is able to take up the stitches, which is difficult for him, because, instead of introducing the needle straight between two threads, he makes it pass through the thread, and thus divides it frequently into several filaments; from this it happens that their knitting always goes on widening, till their hand is regular. To avoid this division, they give them very thick thread, well twisted, and blunt needles. As to the breadth, decrease, and augmentation of the stocking, they can only do it well by calculating the number of turns; when, by habit, they have learned to take up their stitches, and to throw them with the needle in the left-hand, without closing them, they go on extremely quick, knit very fine, make open-work, &c. with as much dexterity as those who can see. Several pupils of the house knit for the hosiers at Paris elastic waistcoats, shirts; and petticoats, which give the greatest satisfaction.

All the blind have not the sense of touch equally fine; there are some who hardly feel the point of the needles, who are very clumsy in turning the thread and taking the stitches; such generally begin with wooden needles, of the same size as those for knitting with worsted.

CHAPTER XII.

Of Spinning.

SPINNING does not offer the same difficulties as knitting; nevertheless, the blind must have great practice to be able to spin even. As they are always inclined to bend forward, it is proper to keep their distaff high, and as near the head as possible; the left-hand, being placed above the yarn, as with those who can see.

This hand holds the distaff, not only to support it, but to distribute and cull the yarn, which passes through the left-hand to be rounded off; the two hands being thus brought near together, can much more easily, than if they were insulated, stop any knots that are formed, without the spinner being obliged to suspend the motion of the foot. He must make the wheel turn gently, in order that the thread may not be too much twisted, which would necessarily happen if the yarn was not given out in proportion with the motion of the wheel. It is, consequently, better that the wheels of their machines should be a little smaller than they commonly are, that the rotation of the bobbin may not be more accelerated than is necessary.

Plate VIII. P.130.

MODE OF SPINNING.

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Plate II. P. 132.

MAKING PURSES.

CHAPTER XIII.

Of Purses.

THE blind make purses in several ways, but especially with the frame, the figure of which is seen, (*pl.* xi.) or with the indented mill. They find more difficulty in making use of the mill, because they are exposed to throw one stitch for another, and thus to destroy their own work without perceiving it.

The frame with rods has not this inconvenience. I should wish to describe the manner of using it; but that is rather difficult when it is not before one. Two strings must be stretched transversely, and at about three feet from each other, one at the top and the other at the bottom of the frame, the two ascending branches of which are separated by an interval of about three lines, which is sufficient for the passage of the rods. The silk is stretched on these two strings, while the hand always passes in front of the frame, and describes a motion in the form of the figure 8. From eighty to one hundred threads of silk are put on, according to the length of the purse; on the right-side of the silk is placed a thread, which is taken into the tissue, and which serves, when the purse is finished, to recover the stitches, so as to sew the borders. There is a great variety of points; but they always begin from right to left, by tak-

ing alternately a silk in front, which is carried backwards, and one behind, which is brought forwards, after having crossed it with that which follows, to form the knot: as the knots which are made would undo if they were abandoned when the work is come to the last thread, the blind man keeps them on his right-forefinger, and stops them by substituting for his finger a thin flat rod, with which he presses transversely the lower stitches, because the work done by the hands alone is repeated at the bottom of the frame by the crossing of the threads; so that there are always two purses made at once.

This business is very proper for blind women, who have generally a finer skin at the end of their fingers than men, and whose hands, besides, being drier, are not exposed to let the silk slip. The combination of the point may be effected in an infinity of ways, and the blind are very ingenious in finding out new ones. Nothing is more common than to see them make flowers, birds, &c. in the tissue of purses. As to the variety of colours in this sort of purses, it only depends on the primitive arrangement of the chain, and the crossing of the threads. The blind who know the bobbins want nobody to set up their frames; they know, moreover, very well what are the colours which can or cannot combine; they do not bring colours too glaring together, and in this respect never offend our taste nor our eyes.

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Plate X.P.133.

MODE OF TEACHING NETTING.

CHAPTER XIV.

Of Girths and Netting.

NETTING is more difficult to the blind: those who can see find great difficulty in forming the meshes. The blind have never yet made silk-net, on account of the extreme fineness of the threads. The obstacle would not have been insurmountable; but the time that must have been given to the execution of this net, would have greatly exceeded its value. We have confined ourselves to make fishing-nets with middling-sized packthread. We have no particular process to describe for this work, in which we employ those blind persons who are to live in places where fishing or hunting are practised; we shall merely observe, that it is very essential to make them sensible how the mesh and the knot are formed, and that the packthread is not to be drawn too hard towards them, to have uniform meshes; for it is in the knots being equal that the perfection of the work consists. Girths are made in the same way as ribbands; the process is too well known to need a description; and, moreover, it has nothing peculiar with respect to the blind.

CHAPTER XV.

Of List Shoes.

THE most simple and most useful works are what we have selected and preferred to teach the blind. Of this number are list-shoes, which they make very well, quickly, and without the assistance of any body;—they teach this work mutually to each other, like all the rest. It would be difficult for them to fasten the strips at an equal distance, if they had nothing to point out the interval they are to keep; for this reason they place on each side of the form a narrow and long piece of leather, pierced with a greater or less number of points, the head of which is against the form, and the extremity without. Between each of these points they pass a strip that has first been fixed above the heel by a head nail, and which is fastened besides at the end of the form by another nail. The perfection of the work consists in afterwards passing the list crossways, and tightening well on the form, (see *plate* xii.) in order to fill up the vacancies that would be left by the uneven edges of the list, which can only be clipped on one side. By the same process they make shoes of merinos, stuff, and coloured skins, which are afterwards lined with lamb's-skin; which makes them at once convenient and pleasant.

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Plate XI. P.134.

MAKING LIST SHOES.

CHAPTER XVI.

Of List Carpets.

It is only of late that list-carpets have been in the number of our manual labours. The mechanism of them, however, is so simple, that one would say it had been invented for the blind; so that they perform this work, which is not laborious, as well as those who see, and both sexes are trained to it without distinction.

As our frames differ a little from those which are used by the manufacturers of chip, it will be necessary to describe it. One sees by the figure, (*plate* xiii.) that the workman must be standing, or sitting on a high seat. The frame, which greatly resembles that of the mattress-maker's, consists of four moveable pieces; first, a strong cross-piece of oak, (*a*) twelve feet long, by three inches of *écarissage*, kept against the wall by two iron hooks; (*bb*) this bar is furnished on its interior edge with hook-nails, which are fixed in it, at the distance of two inches from each other. On each side of this first piece of wood are two other pieces, pierced with holes, at six inches distance, and fixed, by their extremities, (*cc*) by means of cords, which facilitate the displacing, to the cross-piece, which they meet,

forming with it an acute angle. The other extremity rests on two moveable trestles. (*dd*) Opposite the cross-piece, and above the lateral pieces, is a cylindrical roller, (*e*) having an equal number of nails. The list is mounted on the two transversal pieces, by fastening it to the nails and hooks; the number of turns determines the breadth of the carpet, and the length varies according as the cylinder (*e*) is more or less near the cross-piece, (*a*) which adheres to the wall. This piece (*e*) turns on itself, and serves to roll the work already done, by means of a wooden handle, (*f*) which is fastened at pleasure with a cord, which, however, would not prevent the cylinder from rolling, if it were not stopped at its other extremity by a small iron-peg, which goes into the holes of the piece. (*c*) The list being thus stretched lengthways, and the colours properly arranged, there is nothing more to be done than to cross it with other pieces of list, passing alternately above and below from right to left, then from left to right, till we reach the hooks of the cross-piece. The carpet is then unfastened, and the last piece of list is passed crossways to stop it; this, which is the most difficult part, concludes the work.

Our scholars have made a vast number of carpets of all sizes Many benevolent persons have already purchased them to excite their emulation, and to have in their possession some work of these industrious artisans.

CHAPTER XVII.

Of Woollen-plush Shoes.

THE list-shoes we have described in Chapter XI. are not warm, and cannot be worn without a trimming of felt or leather. Those of plush, thicker, and lined with fur, are much warmer. The process for making these shoes was communicated to us by a Dutchman, who sold great quantities of them in his own country, and in the North of Germany. The blind have succeeded completely in fabricating these shoes, which have a great sale, especially in winter. We shall attempt to give an idea of the manner of making them, by first pointing out the choice of the raw material,

For the setting they make use of common wool, which is spun rather thick. Packthread may even be substituted for wool, which makes the work more solid; but the shoe is not so warm. But though wool or packthread may be used indifferently for the setting, it is not the same with the web; for then the shoe would be composed entirely of packthread. The wool for weaving is the same as is used for the setting; but for plush, old carded wool is preferred.

The frame is composed of two pieces: first, of a board, (see *plate* xv, *fig.* 1,) longer or shorter, according to the size of the foot; (*a*) but always a third longer and broader than the common forms. This board is rounded and denticulated in the upper part, (*b*) to receive the woollen threads. The lower part is terminated by a stem an inch broad, (*c*) pierced from before backwards; this stem enters into an opening, formed in the midst of a piece of wood, rounded, (*d*) and furnished all round with pegs more or less distant, according to the size of the frame. The wool being set on the frame, is arranged on it, as is seen in *fig.* 3. The part which is outward on the frame becomes inward, when the shoe is turned, after being finished.

The woollen threads are passed transversely from one side to the other, and when they get to one of the edges, the thread is bent back on itself to go over the same in a contrary direction, taking care to interpose between the meshes, at about six lines distance, a flock of loose wool. When all the threads, stretched from one extremity of the frame to the other, are thus trimmed, the packthreads are cut level with the pegs, and are tied strong together, in order to close the heel. The upper threads are cut three lines from the meshes, and are made to go in below, that they may retain the threads and be hid. The wool that comes over the meshes is then combed with a fine card; which makes

a soft even fur-lining, much better than the skins of rabbits and lambs, with which list-shoes are commonly trimmed. Finally, the shoe is turned when finished, and then takes the form indicated by *figure* 4.

The best way of holding the frame is to place it between the knees, with the upper part resting against the breast. It must not be made so tight as not to turn easily, according as the shoe is trimmed, as is indicated in *plate* xiv.

CHAPTER XVIII.

Of Catgut Whips.

The manufacture of whips in the loom is no longer lucrative, since machinery has been invented by which a single man can make a great many at once. Nevertheless, as the blind can never make whips with the machinery, without assistance, as they did formerly with the frame, we think proper to describe it, that those who wish to make use of it may be able to copy it.

Two parallel boards, fourteen inches in circumference, (*plate* xvi, *aa*) supported by vertical brackets fifteen or sixteen inches high, (*bbb*) which, uniting them, form the *boisseau*. The interval between each bracket is filled with linen, or skin. This *boisseau* is supported by a foot, (*c*) which is hollowed internally the length of a common whip. The thread or gut which is to cover the whalebone or cane is rolled on leaded bobbins, which hang on the sides of the frame. (*ddd*) The whip is fixed in the tambour by a moveable bolt with a spring. (*e*) By turning the *boisseau* alternately from right to left and left to right, the blind person covers the whip, by making the meshes he wishes, according as he com-

bines the threads, the mingling of which produces the variety of points.

The whip is fastened by the upper part to a cord, (*f*) which is stretched by means of a weight, (*g*) suspended to its extremity, by which means the blind man has only to open the bolt (*e*) to raise the whip.

The blind are very clever in raising this frame, which is at the same time an agreeable recreation for them. Some of them can make as many as ten whips a day in this way, which, before the establishment of the machinery, was a livelihood.

CHAPTER XIX.

MANUAL WORKS, PECULIAR TO BOYS.

Of Weaving.

If there is any profession that is eminently suitable to the blind, it is that of weaving, which they have only been put to, however, since the translation of the establishment, though there had been for a long time, in the spinning house of the hospitals, among the other workmen, a blind man, who supported his family by the produce of his labour.

Except setting the warp, for which sight is indispensable, there is no part of weaving which the blind cannot execute: they fix themselves the pieces on the looms: they prepare and dry the warp without burning the threads. They manufacture sail-cloth, of which sacks and sails are made, and worked napkins. We have even contrived to teach them to make cotton-handkerchiefs of different colours. To prevent their making any mistake in throwing the shuttle, a packthread is placed on the right-side of the warp, (see *plate* xvii, *fig. a*,) and is rolled with it on the beam, (*b*,) and has knots of different

sizes, which indicate the change of colour, and the number of throws to be made with each shuttle. One, or several notches, at the extremity of the shuttle, according as has been agreed, serves to make the colours known.

Our frames differ from the common ones only by a denticulated wheel, which we have added on the right-side of the beam, on which an iron hatch (*d*) rests, rendered moveable by a cord, (*cc*) by which the warp may be unrolled without changing one's situation, in proportion as the web is wove and moved off.

CHAPTER XX.

Of Straw-bottoms for Chairs.

THE making straw-bottoms for chairs is a mode of industry which the blind perform with ease. It is sufficient to cast one's eyes on the plate to be convinced of the simplicity of this business.

Straw-bottoms for chairs are generally made with rye-straw dyed, or of its natural colour. It is wet and made into bundles, and beat with a wooden hammer, in order that the straws, coming nearer together, may be formed into cords, more or less thick. The chair is placed on a turniquet, with a double branch and a screw, (see *plate* xviii, *fig. a*,) which rests on a stem, (*b*) fixed in a stone, (*c*) heavy enough not to be overturned by the weight of the chair. The blind man being seated, with his hands on a level with the upper-part of the chair-bottom, he fastens the first straws on the side of the back of the chair, and continues turning it round every time he adds a straw.

The blind can work plain or coloured straw equally well; but the work which suits them best, is that of the coarse chairs that are used in the churches or public walks.

I have not mentioned straw-hats, as the way

of making them is sufficiently known. It has much connexion with other works in straw. The blind make the flat straw very well, such as women's hats are made of in Switzerland; but they take a long time to join the pieces together; for which reason they have given up making the finer sort of straw-hats, which, though more difficult to make, were neither handsomer nor more saleable.

CHAPTER XXI.

Of Rope-making.

The blind easily learn the business of rope-making, which we teach, in preference, to those who are to inhabit sea-ports.

They are first employed with coarse tow, to accustom them to spin smooth. The right-hand is placed before the left to stop any thing which might render the cord uneven, as we have observed for the spinning of thread. It is necessary that the hemp should be much wetted, and the wheel turned gently, that the thread may not be twisted too much, because, of course, they separate the yarn slower than those who see.

They can make cord or common ropes, but not cables, as well as those who see; but this part of the business is now done by machinery.

They are employed in combing hemp, even with the finest combs; and the delicacy of their touch serves them better in this operation than our eyes do us.

They use the machinery for making balls of packthread with great address, and make these as well as those who can see.

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Plate III. P. 150.

MAKING BASKETS.

CHAPTER XXII.

Of the Basket-trade.

The basket-trade is only one of the dependencies of the chip-work, which we have already mentioned. It was one of the first trades given to the blind, because they can perform every part of it without assistance from those who see.

For some years past, however, we have had no workshop for baskets at the Institution, from the difficulty we found in disposing of them, and the capital they required in advance. The baskets when made occupied a great deal of room, and were damaged by drying up.

Notwithstanding, this business is completely suited for the blind, who, when they were employed in it, made very pretty articles, not only of osier, but also of rice and rye straw, and rushes, which were not in the least inferior to those made by the blind in London, who are almost solely employed in basket-making.

CHAPTER XXIII.

Of Mats of Straw, Rushes, and Spanish Plush.

We have frequently said, the more easy the trades that are given to the blind, the more advantageous they are to them. Nothing is easier than to make them perform extraordinary feats, by accustoming them to conquer difficulties apparently insurmountable; but what advantage would such useless employments be to these unfortunate beings?

All the scholars, without distinction, learn to make straw and rush mats, as they are sure articles of sale in almost every part of France.

Straw mats.—They are made with rye-straw, which is more solid than any other. They begin by wetting the straw, and beating it, to render it flexible; the braids are made with three stalks, and should be flat and very smooth. They are taught early to take them up below, that no ends may be seen on the upper part of the mat. They must not be made to wait for another bundle till they have entirely finished the first, as the mat would then be uneven. The straw is hung on a trestle, before which the workman is placed, seated or standing.

Rush mats.—They are made with rushes gathered on the bánks of rivers, which, always preserving a greenish colour, makes it unnecessary to dye them. These rushes are moistened and beat in the same way as the straw; but when the mats are made, they are carefully dried, for fear any moisture within them may make them rot. These mats are much easier to make than those of straw.

Plush mats.—These mats, which are also called *gazon*, on account of their green colour, are made of a very fine rush, which grows in Spain, on the shores of the Mediterranean. In that country they are used for making coarse mats for packing up the Alicant soda. We buy them of the druggists to get the rushes, which are picked out according to their length and size, and joined in bundles when they are to be used; they must be well tied together, in order to be beat with an iron bar, to bruise each stalk and divide it into plushy filaments. Thus prepared, it is formed into braids with five branches; but as it is commonly of a yellowish colour, it is necessary to dye it to make it green.* The braids being fastened to hooks

* This dye is made with three ounces of indigo, diluted in a quart of weak sulphuric acid, which gives at first a bluish solution; to make it green, a pound of the yellow root of *curcuma longa* is added, in powder, which is diluted in twelve buckets of cold water;—with this may be dyed about thirty-eight fathoms of mat.

fixed in two long cross beams, the blind man sits on these mats, and, with a long needle, and waxed packthread, sews them together, first two and two, then four and four, and so on progressively.

CHAPTER XXIV.

Games of the Blind.

The habitual state of concentration in which the blind are plunged from the want of objects to distract them, makes some diversions necessary for them; this has induced us to make known a part of our games: too much cannot be done to alleviate their lot; and the intention, I trust, will excuse the description I here insert of some of their games.

The blind have long since played at cards with great dexterity, either with each other, or with people who see. Cards had been made for them in which the colour was raised a little; but this soon rubbing off gave rise to mistakes, and it was found better to have them pricked. We shall select clubs, to show how such cards are commonly made: the king is indicated by a point placed at the junction of the upper third of the card with the two inferior thirds; the queen, by a point placed at about the upper sixth and to the right; the knave, in the same position, to the left; the ace, in the upper sixth, but in the mid-

dle, and above the king; the 10, in the upper third, to the right; the 9, in the opposite direction. The 8 is marked like the queen, and the 7 like the knave, except that the point is placed in the interval between the ace and the queen. The other cards are marked in the same way, and only differ by the number and position of the points. The hearts are indicated by two horizontal points (..); spades, by two points placed diagonally (:) ; diamonds, by two vertical points (:).

The pricking should be made from the outside inwards, that the rough may be felt on the same side as the colour ; and, if the blind play with people who can see, their cards may not be known. The pricks need not be very large, and may be done with a fine needle, which is sufficient for most blind persons.

Of Chess.

Chess is perfectly fit for the blind, as it requires calculation, and because, even in their recreations, they like to occupy their minds. But it is necessary to make the men solid by fixing them on the board, which we have contrived to do, by placing a round pivot at the lower end of each chessman, which goes into a hole formed in the squares of the board. The blind recognize their adversary's men by a little thin point almost imperceptible, on the knob at their upper end,

By these means they can touch the men without overturning them.

Of the Game of Draſts.

All that is necessary for the blind in this game is, that the men should be made of different kinds of wood. A Draft-board, however, might be made on purpose for them, with the squares of one colour, a quarter of a line lower than the others, and the men might be distinguished by a notch on the upper part. A pivot also might be put under them to stop them.

The blind play with the same dexterity at trictrac, (if the men are arranged for them, at dominos, dice, and all other games, provided they are told exactly the numbers and colours, when they have no means of having them in relief.

CHAPTER XXV.

Conclusion.

I HERE conclude what I had to say on the instruction of the blind. . May the efforts I have made to make myself worthy of public esteem not be lost! I shall think myself happy if they contribute to excuse the imperfections of a work made in a hurry, in the midst of the laborious occupations of my employment

The greatest part of this work is composed of descriptions of mechanical works which it is not easy to embellish. I have endeavoured to compensate, by the exactness of the facts, for what is wanting in regard to correctness of style, and purity of expression. I repeat, in concluding, to make the blind known, with their qualities and defects; to tell in what studies and occupations they may be usefully employed, to excite sentiments of benevolence and interest in favour of them; such are the objects I proposed to myself in writing this Essay. If I have attained them, my wishes are fully gratified.

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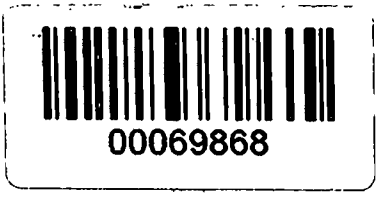
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